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Novogrudskii (D. N.). Почвенная Микробиология. [Soil microbiology.]—402 pp., 25 fig., Kazakh Acad. Sci., Alma-Ata, 1956. Roubles 24.30. [300 ref. Received Oct. 1958.]

This book is intended for Soviet microbiologists, soil scientists, and agriculturists. The 1st section covers physical, physico-chemical, and chemical conditions of the soil (pp. 20–148); the 2nd, soil bacteria and actinomycetes (pp. 149–255); the 3rd, soil fungi (pp. 256–313); the 4th, soil protozoa (pp. 314–367); and the 5th, soil algae (pp. 368–396). Section 3 deals with the different systematic groups, to aid identification, and methods of isolation and culture. Information is given on the different spp. in different soils, depth of distribution, the influence on pH, and the seasonal changes.

Starkey (R. L.). **Interrelations between microorganisms and plant roots in the rhizosphere.**—*Bact. Rev.*, **22**, 3, pp. 154–172, 1958. [147 ref.]

This is a critical survey of the literature under the main headings of the effects of plants on micro-organisms in the soil and the effects of rhizosphere micro-organisms on plants. Subsections of the former are concerned with the abundance of micro-organisms in the rhizosphere, physiological and nutritional groups of bacteria in the rhizosphere, physiological activity of rhizosphere bacteria, organic matter excreted from roots, and factors affecting the development of micro-organisms in the rhizosphere; those of the latter comprise occurrence of micro-organisms in plants, influence of organic materials on plant development, and effects of micro-organisms on availability of nutrients.

Kendrick (J. B.) & Jackson (A. R.). **Factors influencing the isolation of certain soil-borne plant pathogens from soil.**—Abs. in *Phytopathology*, **48**, 8, p. 394, 1958.

By plating maize seed on water agar after incubation in soil [cf. **36**, p. 615], spp. of *Pythium*, *Rhizoctonia*, *Fusarium*, and *Sclerotium* were trapped. *P.* and *R.* were dominant at medium to high soil moisture levels, *F.* being less affected by moisture unless excessive. *R.* was readily recovered at 33° C., whereas *P.* and *F.* were favoured by lower temps. Similar isolates were obtained by transferring to water agar disks of a cornmeal agar suspension containing a measured quantity of soil and incubating at 24° for 10–14 days. The amount of soil/agar disk and percentage recovery were correlated.

Naumann (K.). **Die Beeinflussung der Bodenmikroflora durch hochprozentige Parathionzusätze bei verschiedener Bodenfeuchtigkeit.** [The influence on the soil microflora of high percentages of parathion supplements at different soil-moisture levels.]—*Naturwissenschaften*, **45**, 16, pp. 395–396, 1 graph, 1958.

Particulars are given of experiments at the Institut für Phytopathologie, Aschersleben, Germany, which demonstrated the stimulatory influence of soil treatments with parathion (1:100 dry wt.) on the [unspecified] fungal and bacterial populations, especially at moisture levels of 21·7 and 17·7%; at 12·7% the effects were less pronounced.

Pohjakallio (O.) & Makkonen (R.). **On the resistance of the sclerotia of some phytopathological fungi against their parasites.**—*Acta chem. fenn.*, **30** B, 11, p. 222, 1957.

In *in vitro* experiments at the Dept of Plant Pathology, University of Helsinki,

Finland, many common soil fungi, e.g., *Acrostalagmus roseus* [*Verticillium roseum*], *Trichoderma viride*, *Trichothecium roseum*, and species of *Gliocladium*, *Verticillium*, *Penicillium*, and *Mucor*, proved pathogenic in varying degrees to the sclerotia of *Sclerotinia trifoliorum* [**37**, p. 571], *S. borealis*, *S. sclerotiorum*, *Botrytis cinerea*, and *Claviceps purpurea*. The relative resistance of *S. sclerotiorum* to infection is attributed to the rapid healing of injuries to the sclerotial cortex. The regenerative capacity in its turn is connected with the high catalase activity and efficient respiration of the shelled sclerotia compared with the corresponding functions in the other species investigated.

Darley (E. F.) & Wilbur (W. D.). **Protective role of the pseudosclerotium of Armillaria mellea against attack by Trichoderma viride.**—Abs. in *Phytopathology*, **48**, 8, p. 392, 1958.

Sections of citrus roots artificially infected with *A. mellea* and uninfected roots were buried for 3 yr. in soil naturally infested with various fungi, including *T. viride*. The roots of one lot were intact, from another the bark (and pseudosclerotium in infected roots) was removed, and in a 3rd the roots were split as well. *A. mellea* remained viable in all but 1 of the roots for up to 36 months despite the damaged pseudosclerotium, which re-formed, incompletely, after 17 months [cf. **34**, p. 366; **37**, p. 649].

Valder (P. G.). **The biology of Helicobasidium purpureum Pat.**—*Trans. Brit. mycol. Soc.*, **41**, 3, pp. 283–308, 2 pl., 2 fig., 1958. [36 ref.]

The vegetative mycelium of 2 isolates of *H. purpureum* studied at the Botany School, Cambridge, was shown to be binucleate. Both isolates utilized ammonia, nitrate N, and amino acids and required thiamine and an unknown growth factor. Growth through soil depended on a food base and was little affected by a wide range of soil conditions [cf. **28**, p. 618]; it showed an affinity for continuous surfaces and was stimulated by pieces of carrot root only after contact. Hyphae growing from food bases in soil formed branched cohering strands [cf. **26**, p. 124] further bound together by anastomoses and side branches. As the strands fail to develop in sterilized soil, the nature of the hyphal attraction could not be determined. The survival of sclerotia was poor in acid soils, in which there was a high incidence of spontaneous germination, but was little affected by varying conditions in slightly alkaline soils.

Capriotti (A.). **Las levaduras de algunos terrenos españoles.** [The yeasts of some Spanish soils.]—*Rev. Cienc. apl.*, **12**, 2, pp. 97–115, 15 fig., 1958. [101 ref.]

From 8 soil samples from the provinces of Ciudad Real (5), Toledo (2), and Madrid (1), the author isolated 12 spp. of yeasts, of which 8 were sporogenous. They included 2 new spp. *Zygosaccharomyces franciscae* and *Schwanniomyces castelli* [without Latin diagnoses]. The most prevalent spp. were *Saccharomyces ellipsoideus* and *Torulaspora rosei*. *Candida albicans* was isolated from 1 sample.

Lamb (C. A.), Bentley (O. G.), & Beattie (J. M.) (Editors). **Trace elements. Proceedings of the Conference held at the Ohio Agricultural Experiment Station, Wooster, Ohio, October 14–16, 1957.**—xii+410 pp., 10 fig., 8 diag., 64 graphs, New York and London, Academic Press Inc., 1958. $12.00.

This symposium, dealing with different aspects of trace element nutrition in plants, animals, and micro-organisms, was held to commemorate the Diamond Jubilee of the Station. Included are papers on: 'Manganese deficiency in soybeans' by H. J. Mederski & D. J. Hoff (pp. 99–108) [**34**, p. 568]; 'Manganese problems in the production of Concord grapes' by J. M. Beattie (pp. 117–123); the deficiency, noticed on acid soils in Ohio in 1952, was related to K deficiency in the same vine-

yard and max. response was obtained only when both elements were supplied in fertilizer at opt. levels (600 lb. K_2SO_4: 300 lb. $MnSO_4$/acre); on 'Manganese toxicity: a possible cause of internal bark necrosis of apple' by H. F. Winter (pp. 125–134) [cf. **34**, p. 602], who showed that the disorder in Ohio was associated with high Mn content of the trees and soil and corrected by liming; and on 'The metabolic role of vanadium and molybdenum in plants and animals' by A. Nason (pp. 269–296).

Richter (B.). **Mangelkrankheiten an landwirtschaftlichen Kulturpflanzen.** [Deficiency diseases of agricultural crop plants.]—*Pflanzenschutz*, **10**, 3, pp. 29–33, 1958.

This popular note touches on deficiency of Mg and B in cereals and potatoes; Cu in red clover; and Mo in cauliflower and red clover.

Vukovits (G.). **Wege zur Behebung der Eisenchlorose.** [Ways to eliminate iron chlorosis.]—*Pflanzenarzt*, **11**, 5, pp. 61–62, 1958.

A brief, popular note on the control of Fe deficiency in fruit trees and other cultivated plants by soil treatment, foliage spraying, or trunk injections with iron chelates [**34**, p. 231].

Ozanne (P. G.). **Chlorine deficiency in soils.**—*Nature, Lond.*, **182**, 4643, pp. 1172–1173, 1 fig., 1958.

When Mt. Barker subterranean clover (*Trifolium subterraneaum*) was grown in Californian Cl-deficient soils at the University of California, Berkeley, and in W. Australian Cl-deficient soils at the C.S.I.R.O. Regional Laboratory, Perth, and cut back at intervals of 3–4 weeks to simulate grazing, acute symptoms of Cl deficiency (T. C. Broyer *et al.*, *Plant Physiol.*, **29**, p. 526, 1954) developed and the plants failed to flower.

Last (F. T.). **The effect of potassium on parasitic plant diseases.**—Reprinted from Potassium Symposium 1956, pp. 179–188, 1 graph (International Potash Institute, Berne), 1957. [34 ref. German, French, and Spanish summaries. Received Oct. 1958.]

In this review from Rothamsted Experimental Station, Harpenden, the author notes the lack of detailed observations on the effect of K on parasitic plant diseases, which appears largely to be confined to its action on the multiplication and spread of the parasite after infection. Fungal leaf diseases and wilts caused by *formae speciales* of *Fusarium oxysporum* are checked, but club root (*Plasmodiophora brassicae*) development on brassicas and the multiplication of viruses (except tobacco mosaic) are favoured. Effects on diseases are generally associated with the metabolism of the host and with growth responses.

De Roon (A. C.) (Editor). **International directory of specialists in plant taxonomy.**—*Regnum veget.* 13, 266 pp., Utrecht, International Bureau for Plant Taxonomy and Nomenclature, 1958. 38*s.* ($5; D.fl. 19).

This valuable directory is in 2 main parts. The 1st part is an alphabetical list of taxonomists, their addresses, years of birth, and taxonomic interests. The 2nd comprises an index of taxonomic specialization, listing workers under taxonomic groups, and an index of regional specialists.

Cejp (K.). **Houby II.** [Fungi II.]—408 pp., 116 fig., Czechoslovakian Academy of Sciences Press, Prague, 1958. Kčs 35. [94 pp. ref.]

This volume [cf. **36**, p. 541] deals with Basidiomycetes (Homobasidiomycetes, Heterobasidiomycetes, and Teliosporae) and imperfect fungi. Treatment is entirely systematic.

Jørstad (I.) & Nannfeldt (J. A.). **Additions and corrections to 'Enumeratio Uredinearum Scandinavicarum'.**—*Bot. Notiser*, **111**, 1, pp. 306–318, 1958.

The number of spp. [**35**, p. 791] is increased by 6. *Uromyces anthyllidis* and its var. *medicaginis* are now considered to be a 'small' sp. belonging to the compound sp. *U. pisi*.

Muhle (E.). **Brandpilze.** [Smut fungi.]—51 pp., 25 fig., Wittenberg Lutherstadt, A. Ziemsen, 1958. DM. 3.75.

This popular booklet comprises an introductory chapter on the importance, distribution, and biology of the Ustilaginales, and chapters on systematics (illustrated by important pathogens) and control.

Rauhala (A.). **Kotimaisia härmäsienilöytöjä sekä tähänastiset tiedot härmäsienilajien kasvimaakunnittaisesta levinneisyydestä maassamme.** [Powdery mildews of Finland with regard to their present distribution.]—*Karstenia*, **4** (*1957*), pp. 14–26, 1958.

An alphabetical list of Finnish Erysiphales with their hosts and localities, references, and a host index.

Hütter (R.). **Untersuchungen über die Gattung Pyrenopeziza Fuck.** [Studies on the genus *Pyrenopeziza*.]—*Phytopath. Z.*, **33**, 1, pp. 1–54, 12 fig., 1958. [English summary. 78 ref.]

As a result of these studies at the Institut für spezielle Botanik, Zürich, the author selects *P. chailletii* as the type species. For 27 names placed under *P.* the author indicates their transference to other genera. A key is given for the 4 genera placed in the Pyrenopezizeae and 4 in the Mollisiae. In cultural work with 13 spp. *Phialophora* conidia were often obtained but seldom did apothecia develop.

The main body of the work is devoted to descriptions of the 35 spp. studied, to which a key is provided.

Hajsig (M.). **Torulopsis apicola nov. spec., new isolates from Bees.**—*Leeuwenhoek J. Microbiol. Serol.* (formerly *Leeuwenhoek ned. Tijdschr.*), **24**, 1, pp. 18–22, 2 fig., 1958.

In an examination at the Institute of Microbiology and Infectious Diseases, University of Zagreb, Jugoslavia, of the intestinal mycoflora of bees 10 hives were sampled (10 bees/hive), *T. apicola* being present in 8. This sp. assimilates glucose, sucrose, and raffinose, but not KNO_3, and slowly ferments glucose and sucrose. Ethanol is not utilized as a sole source of C. Cell measurements after 3 days on malt agar at 25° C. are 2·2–4 × 3–4·3 μ.

Rich (M. A.) & Stern (A. M.). **Studies of Cryptococcus nigricans n.sp. I. Identification and taxonomic classification.**—*Mycopathologia*, **9**, 3, pp. 189–193, 3 fig., 1958.

A description is given of an asporogenous, non-filamentous, black, yeast-like fungus isolated [in the United States] from paint scrapings taken from a petrol storage tank. After 4 days on malt extract agar, oval to round cells 5–7·5 μ diam. were produced. Reproduction was by multilateral budding. Glucose, galactose, maltose, sucrose, lactose, melibiose, and raffinose were not fermented, but glucose, maltose, and sucrose were assimilated as the sole C source.

Matsui (T.). **Black-dots disease of Gloiopeltis tenax (Turn.) J. Ag.**—*J. Jap. Bot.*, **33**, 2, pp. 38–40, 2 fig., 1958. [Japanese. Abs. from English summary.]

Guignardia gloiopeltidis [**29**, p. 472] is recorded on *Gloiopeltis tenax* at Yoshimi, as yet causing little damage.

Guyot (L.), Massenot (M.), & Montégut (J.). **Notes de pathologie végétale.** [Notes on plant pathology.]—*Ann. Épiphyt.*, **9**, 1, pp. 55–75, 7 fig., 1958.

A thick growth of *Helleborus foetidus* on the Causse de Séverac, Aveyron, France, at 800 m. was affected in Apr. 1954 by a brown spotting of the leaves and branches and a brown discoloration and softening or drying of the floral organs. The stamens bore *Cladosporium herbarum*, which with *Stemphylium ilicis* was also isolated from the leaf spots.

Scolecotrichum graminis was found in 1952 at Versailles and Grignon on *Dactylis glomerata*, *Phleum pratense*, and *Arrhenatherum elatius*, injury being fairly serious only on the first-named, and in 1957 on rye near Mantes. Experimental inoculation of rye and *D. glomerata* with spores from rye were positive on rye only. There seem to be 2 races of the fungus, biologically and morphologically distinct. *Mastigosporium rubricosum* on *D. glomerata* at Versailles and Grignon in 1952 caused little damage.

In 1948 *Diplodina destructiva* [**1**, p. 149] was observed on tomatoes near Paris. In 1950 *Botrytis cinerea* occurred on *Solanum pseudocapsicum* at Grignon where *B. tulipae* has been found to be parasitic on *Tulipa gesneriana* and *T. sylvestris*. This parasite is specialized on the genus *Tulipa*, but if wounds are present it develops, probably as a saprophyte, on onion and leek.

Ettlinger (L.), Corbaz (R.), & Hütter (R.). **Zur Arteinteilung der Gattung Streptomyces Waksman et Henrici.** [On the specific classification of the genus *Streptomyces*.]—*Experientia*, **14**, 9, pp. 334–335, 1958. [English summary.]

Existing systems of classification are considered to be based on characters of dubious or low systematic value. From many years' experimentation at the Institut für Spezielle Botanik der technischen Hochschule, Zürich, with some 150 stock strains and over 14,000 isolates it is concluded that specific differentiation is feasible only on the grounds of the following definitely determinable and stable criteria: (1) spore morphology (glabrous, echinulate, or hirsute); (2) colour of the aerial mycelium; (3) morphology of the aerial mycelium (either a sterile central axis producing fertile spore chains or fertile throughout), a further subdivision being based on monopodial or sympodial branching, with special reference to whorl formation, while other constant features are the development and type of spirals; and (4) melanin production.

Brock (T. D.). **Symbolism in heterothallic fungi.**—*Mycologia*, **50**, 3, pp. 444–446, 1958.

The author considers that the present diversity of symbolism used to represent mating types is confusing. Blakeslee's original symbols still appear to be the most convenient. It is proposed, therefore, that (+) and (−) should designate isolates (not genes) which can be arranged as 2 different mating types. When the genetic aspects of mating type are worked out for any species, the genes can be designated by letters.

Uchida (K.), Ishitani (C.), Ikeda (Y.), & Sakaguchi (H.). **An attempt to produce interspecific hybrids between Aspergillus oryzae and Asp. sojae.**—*J. gen. appl. Microbiol.*, **4**, 1, pp. 31–38, 1 fig., 1958.

At the Institute of Applied Microbiology, University of Tokyo, mixed plating of conidia of a white, methionineless mutant of *A. oryzae* [cf. **37**, p. 75] and a yellow, leucineless mutant of *A. sojae* on a medium which allowed only limited growth yielded several brown, prototrophic colonies which were stable on subculturing and possessed some apparently hybrid characters. Hyphal fusions were observed between the parent strains.

GROSSBARD (ERNA). **Autoradiography of fungi through a layer of soil and in agar culture.**—*Nature, Lond.*, **182**, 4639, pp. 854–856, 4 fig., 1958.

At the Grassland Research Institute, Hurley, Berks., in addition to β-radiation, deep penetration by γ-photons was used to locate the position of a radioactive fungus inoculum buried in soil. The fungi used, *Armillaria mellea*, *Fusarium culmorum*, *Phycomyces blakesleeanus*, *Phytophthora cactorum*, *Rhizoctonia* [*Corticium*] *solani*, *Rhizopus stolonifer*, and *Verticillium albo-atrum*, were grown in a nutrient broth or in agar containing the nuclides (γ-ray emitters Cs^{137} and Co^{60}), which they readily absorbed. From some fungi, especially *P. cactorum*, the tracers were leached out on prolonged washing, but others retained a fair proportion of the nuclides permanently in the mycelium. The washed mats were mixed with soil or sand-oatmeal and buried at various depths in autoclaved soil in a glass or aluminium dish; or mycelium was placed at the top of a column of soil in a glass tube.

An envelope-packed Ilford X-ray film Industrial *B* resting on a lead sheet $\frac{1}{16}$ in. thick was placed beneath and on top of the dish, or below the growth tube. The photographic effect of γ-photons is, to a large extent, a result of the emission of secondary electrons from the lead. The preparations were exposed for 14–28 days. Whatever the shape of the inoculum, whether buried in soil, on top, or at one end of a soil column, the image was a circular area of blackening, revealing no details of morphology. The actual position of the inoculum could be located with some accuracy.

Evidence was obtained that, at least in agar cultures, Cs^{137} and Co^{60} were transported by *Phycomyces blakesleeanus*, *R. stolonifer*, and *Phytophthora cactorum*. Fragments of sporangiophores of *R. stolonifer* were removed from 2 to 3 cm. above a substrate containing Co^{60}, teased out in water, allowed to dry on a slide, and wrapped in cellophane. The slide was placed on an X-ray film with the fungus facing the emulsion, wrapped in a light-proof envelope, and exposed for 28 days. The individual fragments of the sporangiophores and the sporangia were easily discernible. Co^{60} had been translocated through the sporangiophores and accumulated in the sporangia.

To demonstrate the absorption and accumulation of a tracer by hyphae submerged in a radioactive substrate very thin sections of agar cultures of *C. solani* containing Co^{60} were placed on slides and allowed to dry. The conc. of tracer grains in the hyphae was much greater than in the background, suggesting an accumulation of the tracer. To study translocation into the aerial mycelium while avoiding leaching of the tracer the radioactive agar was inoculated with a fungus which was able to grow over a cover slip as a thin mat, e.g. *P. cactorum*, *C. solani*, and *F. culmorum*, an ideal preparation for the stripping film technique from which autoradiograms could be prepared. If they were rapidly immersed in a water-bath to lift the sections of strippable film, and dried rapidly in a specially designed tower, there was no appreciable leaching of the tracer. The results indicated that Co^{60} is transported by protoplasmic flow and not held by the cell wall.

CORKE (A. T. K.). **A trap for water-borne spores.**—*Plant Path.*, **7**, 2, p. 56, 1 pl., 1958.

A description is given of an improved device for collecting rain water containing spores from fruit trees [cf. **36**, p. 193]. The trap, consisting of a light metal gutter which drains into a large glass tube, may remain in position throughout the year.

EMEIS (C. C.). **Die Gewinnung von Askosporenmassen von Saccharomyces-Arten auf Grund besonderer Oberflächeneigenschaften.** [The extraction of ascospore masses of *Saccharomyces* species by virtue of particular surface properties.]—*Naturwissenschaften*, **45**, 18, p. 441, 1958.

The lipophile properties of the surface of spores of *S.* spp. were utilized in the

separation of spores from vegetative cells at the Institut für Gärungsgewerbe, Berlin. Sporulating cultures were treated with glass powder in an homogenizator, whereby the ascus walls were destroyed and the spores liberated. On shaking with paraffin the spores are taken up in bulk and separated from the remaining cells and intact asci. The paraffin suspension can be plated directly on a suitable medium.

Lowy (B.). **On preparing fleshy fungi for the herbarium.**—*Mycologia*, **50**, 3, pp. 442–444, 1 fig., 1958.

A method devised by Dr. G. Bohus of Budapest and used at Louisiana State University, Baton Rouge, is described. Gelatin (40 g.) is dissolved in 200 ml. water and applied to low-rag content paper with a broad brush. When dry the sheets are flattened by a weight. Longitudinal sections 1–1·5 mm. thick are cut through the centre of the cap and stipe of a fresh fungus, and the gills removed from the halved cap and the flesh from the stipe by cutting and scraping, until both are about 1–1·5 mm. thick. The prepared caps and stipes are then placed on the gelatin-coated paper, which reduces shrinkage, pressed, and subsequently pasted on herbarium-grade paper. In very humid areas it is advisable to remove the gelatin-coated paper by moistening in water and to mount the mushrooms directly.

Raabe (R. D.) & Wilhelm (S.). **Holding melted water agar for pouring plates.**—*Plant Dis. Reptr*, **42**, 6, p. 817, 1958.

Experience at the Dept of Plant Pathology, University of California, Berkeley, has shown that melted water agar for pouring natural media plates [**26**, p. 554] may be conveniently stored up to several days at 50° C. in tightly capped, 200–400 ml. prescription bottles.

Schuster (G.). **Virus und Viruskrankheiten.** [Virus and virus diseases.]—79 pp., 34 fig., Wittenberg Lutherstadt, A. Ziemsen, 1957. DM. 5.20.

This popular booklet, dealing with the whole field, includes a section on plant pathogens (pp. 31–55), covering symptoms, movement within the host plant, transmission, and control, with brief reference to some important diseases.

Ross (H.). **Probleme der Resistenzzüchtung gegen Viruskrankheiten in Pflanzen.** [Problems in breeding for resistance to virus diseases in plants.]—*Arch. dtsch. LandwGes.*, **17**, pp. 95–108, 5 fig., 1 graph, 1956. [34 ref.]

The author recognizes 4 types of resistance to virus infection, viz. tolerance, 'infection resistance', hypersensitivity, and extreme resistance. Infection resistance is defined as being such that in the field only a small percentage of plants is affected, e.g. resistance to leaf roll virus in the potato vars. Aquila, Augusta, and Apta.

Leaf roll of potato is taken to illustrate the incorporation from wild *Solanum* spp. of a polygenically determined infection resistance [cf. **36**, p. 265], while breeding for infection resistance to mosaic virus in tobacco, and to viruses A, X, and Y in potato, illustrates the incorporation, from wild species having extreme resistance, of genes for oligogenically determined resistance. Progeny of *S. stoloniferum* [**38**, p. 24] or *S.s.*×*S. andigenum* both backcrossed 2–4 times to potato all showed extreme resistance to Y, A, and *Phytophthora infestans*, but when *S. acaule* was used as a basis, alone or with *S. demissum* or *S. andigenum*, backcross to potato gave high resistance to X in all clones and resistance to A in some; clones 54.4129/306 and 54.415/7 from *S. acaule*×*S. stoloniferum* combine resistance to all 4 agents.

John (V. T.). **A review of plant viroses in India.**—*J. Madras Univ.*, **27**, B, 2–3, pp. 373–450, 1957. [263 ref. Received Oct. 1958.]

Most of the information in this summary covering 70 diseases affecting 59 spp.

from 19 families has been obtained from articles noticed in this *Review*. The diseases are arranged according to the type of symptoms produced (mosaic diseases, streak diseases, etc.), with notes on symptoms, transmission, virus properties and affinities, and other relevant information. A host index and tables of the physical properties of the sap-transmissible viruses and of insect vectors and the diseases they transmit are appended.

Protsenko (A. E.). Электронномикроскопия фитопатогенных вирусов II. [Electronmicroscopy of phytopathogenic viruses II.] **Solanophilus tuberosi Rischkov and Aphidophilus tuberosi Rischkov.**—*Bull. Acad. Sci., U.S.S.R.*, Sér. biol., *1958*, 4, pp. 451–455, 1 pl., 1 graph, 1958. [English summary.]

This study at the Institute of Microbiology, Soviet Academy of Sciences, Moscow [cf. **26**, p. 183; **35**, p. 118], showed that most particles of potato virus X were 500 mμ, of potato virus Y 700 mμ, and of tobacco mosaic virus 300 mμ.

O'Konski (C. T.) & Haltner (A. J.). **Characterisation of the monomer and dimer of Tobacco mosaic virus by transient electric birefringence.**

O'Konski (C. T.) & Haltner (A. J.). **Electric properties of macromolecules. I. A study of electric polarization in polyelectrolyte solutions by means of electric birefringence.**

O'Konski (C. J.) & Pytkowicz (R. M.). **II. Evidence for a permanent dipole moment in the rib grass strain of Tobacco mosaic virus.**—*J. Amer. chem. Soc.*, **78**, pp. 3604–3610, 1 fig., 1 diag., 3 graphs, 1956; **79**, pp. 5634–5649, 2 fig., 13 graphs; p. 4815, 1 fig., 1957.

Further accounts of studies at the University of California [cf. **36**, p. 280].

Brakke (M. K.). **Estimation of sedimentation constants of viruses by density-gradient centrifugation.**—*Virology*, **6**, 1, pp. 96–114, 5 graphs, 1958.

At Nebraska Agricultural Experiment Station, Lincoln, the sedimentation constants [**35**, p. 529] of the following viruses (tobacco mosaic virus = 1·0) were: bean southern mosaic 0·59, barley stripe mosaic 1·01, wheat streak mosaic 0·86, brome mosaic 0·41, and potato yellow dwarf 4·4–4·8. The advantages of the method over the analytical centrifugal method are that impure virus and low concs. can be used, the method is simple, and the apparatus inexpensive.

Niu (C.-I.), Shore (V.), & Knight (C. A.). **The peptide chains of some plant viruses.** —*Virology*, **6**, 1, pp. 226–233, 1958.

Tomato bushy stunt virus, potato virus X (ring spot strain), cucumber virus 3 [strain of tobacco mosaic virus], and cucumber virus 4 [strain of cucumber green mottle mosaic virus] were analysed. A hydrozinolysis procedure demonstrated the C-terminal residues to be leucine, proline, alanine, and alanine, respectively. These viruses resemble tobacco mosaic virus in that free N-terminal amino acid residues cannot be demonstrated.

Van Hoof (H. A.). **Onderzoekingen over de biologische overdracht van een non-persistent virus.** [Investigations of the biological transmission of a non-persistent virus.]—*Meded. Inst. Plziektk. Onderz. Wageningen* 161, 96 pp., 19 pl., 8 fig., 1958. [Reprinted as Proefschrift, Alkmaar, Van Putten & Oortmeijer, 1958. English summary, pp. 87–94. 75 ref.]

In this series of studies to clarify the mechanism of virus transmission by aphids, the structure of the stylets of *Myzus persicae* is described in some detail. Experi-

ments with detached stylets and glass fibres did not support Van der Want's hypothesis [**35**, p. 260] that transmission occurred when virus, adsorbed at the stylet surface during feeding on an infected plant, was released during subsequent feeding on a healthy plant. In pressing the labium against detached pieces of hyacinth epidermis before probing, the aphids left a distinct salivary imprint which was characteristic for the sp. With fasted and non-fasted specimens of *M. persicae* and *Aphis fabae* the times taken to pierce right through the epidermal cells [cf. **36**, p. 573] were 126 and 145, and 152 and 155 sec., respectively. With *M. persicae* the time required for penetration of the epidermal cell walls (intracellular penetration) was 40 and 55 sec. in the 2 instances observed, compared with 20, 17, and 13 sec. for intercellular penetration. Similar results were obtained with broad bean (Jan.–Mar.), but in June the times were shorter, once as little as 25 sec.

M. persicae readily acquired lupin [bean yellow] mosaic virus [cf. **37**, p. 483] from broad bean leaves, but did so from stripped epidermis only when it probed the transverse cell wall [i.e. intercellular penetration]: since penetration is usually effected in this way it was concluded that the aphids acquired the virus within the cell wall. The reason for poor transmission from spongy parenchyma after removal of the epidermis is thought to result from the penetration of the intercellular spaces, where the contact between the stylets and the cell walls is less close than in the epidermis. Virus uptake seems to depend on whether the leaf is alive or dead. *M. persicae* did not transmit lupin mosaic virus from infected broad bean leaves which had been killed by heat or freezing, but mechanical transmission from them was still possible, though much reduced when the leaves were dipped for 5 min. in water at 48–50° C.: the absence of virus activity in the supernatant fluid after centrifugation of heated sap indicated that coagulation of the virus particles had occurred. There was likewise no aphid transmission from leaves killed by various chemical agents. Impregnation of infected leaves with water or healthy plant sap did not affect transmission, but reduction of their water content reduced it, this process being reversible. Transmission from pieces of epidermis removed by razor blade was superior to that from stripped epidermis. Aphid transmission was not affected by light. Aphids transmitted the virus from plasmolysed infected leaves and were able to infect plasmolysed healthy leaves, though these were not susceptible to mechanical inoculation.

No explanation was found as to why the virus is less easily acquired from stripped epidermis, but it is suggested that non-persistent viruses occur in 2 forms, viz. a mechanically transmissible form (complete particles) and an aphid transmissible form (the nucleic acid).

The inhibitory effects of ultra-violet irradiation [cf. **35**, p. 272] were thought to be attributable to the formation of an inhibitor which is inactivated in the living cell under the influence of the light. It is suggested that an inhibitor may be produced in epidermis removed by stripping (cf. Bradley & Rideout, *Canad. J. Zool.*, **31**, pp. 333–341, 1953).

Bradley (R. H. E.) & Mackinnon (J. P.). **Effects of trichothecin on some viruses transmitted by aphids.**—*Canad. J. Microbiol.*, **4**, 5, pp. 555 556, 1958.

At the Canada Dept of Agric., Ottawa, 3-leaf tobacco seedlings were sprayed with 3 p.p.m. trichothecin [**37**, p. 219] before aphid infection with cucumber mosaic, henbane mosaic, and tobacco etch viruses. Similar seedlings of *Physalis floridana* were sprayed with 25 p.p.m. trichothecin both before and after infection with potato Y, turnip latent [*P. floridana* yellow net], and potato leaf roll viruses. The numbers of plants that became infected (out of 40 tobacco and 50 *P. floridana*) were, respectively, 12, 0, 5, 4, 14, and 26 in the treated plants, as opposed to 17, 16, 23, 19, 26, and 29 in the controls.

Freitag (J. H.). **Cross-protection tests with 3 strains of the Aster yellows virus in host plants and in the Aster leafhopper.**—Abs. in *Phytopathology*, **48**, 8, p. 393, 1958.

Three Californian aster yellows virus strains [cf. **37**, p. 462] were designated 'severe', 'dwarf', and Tulelake. Inoculation of *Nicotiana rustica* and *Plantago major* with 'dwarf' before either of the others gave predominantly dwarf symptoms; with Tulelake 1st, initial Tulelake symptoms were followed by recovery and sometimes delayed symptoms of the challenging strain. Of 38 leafhoppers [*Macrosteles fascifrons*] fed 2 weeks on 'dwarf' and 2 on 'severe', 36 transmitted only 'dwarf'. Fed every alternate 2 days on 'severe' and 'dwarf' for 20 days, 38 of 41 vectors transmitted only 1 strain. Fed 2 weeks on Tulelake and 2 on 'dwarf', all transmitted Tulelake at first, then 16 of 24 only transmitted 'dwarf', though 8 did not change. Thus, the strains reacted similarly in both insect and plant hosts depending on the sequence and combination used.

Špaldon (E.), Blattný (C.), & Bojňanský (V.) (Editors). **Proceedings of the Scientific Conference on stolbur and similar diseases causing sterility, Smolenice, 17–18 September, 1956.**—244 pp., 38 fig., 5 graphs, Bratislava, Slovak Academy of Sciences, 1958. [Czech, Russian, and German versions.]

The opening address by E. Špaldon [pp. 25–33] was followed by a general paper on stolbur [cf. **36**, p. 680] by C. Blattný [pp. 37–54]. A. Kvíčala & Mme J. Nováková-Pfeiferová [pp. 55–76] dealt with the relations of stolbur and virus yellows; J. M. Todd [pp. 77–101] reported on witches' broom of potatoes and similar diseases in Great Britain; M. Panjan [pp. 102–108] described stolbur in Yugoslavia; J. Szirmai [pp. 109–118] stolbur in Hungary; I. C. Kovachevski [pp. 119–133] the stolbur of Solanaceae in Bulgaria; A. Heine [pp. 139–141] stolbur and aster yellows in Germany; J. Brčák [pp. 142–150] discussed some ecological problems of the stolbur vectors; V. Bojňanský [pp. 151–167] described stolbur in potatoes; V. Valenta [pp. 168–177] made a contribution to the question of northern stolbur in Czechoslovakia [**36**, p. 781]; E. Jermoljev & V. Průša [pp. 178–197] spoke on hair sprouts of potatoes [cf. **35**, p. 841; **36**, p. 422]; J. Pozděna & M. Čech [pp. 198–204] on the preparation of stolbur antiserum and the influence of inhibitors on the serological reactions of stolbur; Vera Kosljarová [pp. 205–208] on the non-sprouting of potato tubers as one of the symptoms of stolbur; E. Jermoljev & V. Průša [pp. 209–214] on the comparison of the physiology of healthy leaf roll, and stolbur infected plants; J. Čermák [pp. 215–218] on stolbur of tobacco; and J. Bednár [pp. 219–222] on the curing of stolbur tobacco. The Proceedings end with a summary of conclusions approved by the Conference and recommendations.

Brandes (J.) & Paul (H. L.). **Das Elektronenmikroskop als Hilfsmittel bei der Diagnose pflanzlicher Virosen. Betrachtungen zur Vermessung faden- und stäbchenförmiger Virusteilchen.** [The electron microscope as an aid in the diagnosis of plant viroses. Considerations on the measurement of filiform and rod-shaped virus particles.]—*Arch. Mikrobiol.*, **26**, 4, pp. 358–368, 2 graphs, 1957.

Reference has already been made to most of the studies on which this review is based. When the normal particle lengths of viruses are clearly different, careful measurement suffices for diagnosis, but if they are similar the electron microscope affords valuable aid in differentiation. Absolute reliability, with the exclusion of extraneous but morphologically similar particles, can almost always be secured by the use of appropriate hosts.

Lutte chimique contre les principaux ennemis et les principales maladies du Cacaoyer. [Chemical control of the main pests and diseases of Cacao.]—*Café, Cacao, Thé*, **2**, 2, pp. 68–79, 14 fig., 1958.

In this account from the Centre Technique d'Agriculture Tropicale, Paris, 11 diseases are dealt with.

Thresh (J. M.). **The control of Cacao swollen shoot disease in West Africa. A review of the present situation.**—*Tech. Bull. W. Afr. Cacao Res. Inst.* 4, 36 pp., 1 pl., 1958. [75 ref.]

This publication summarizes past investigations, which have been noticed [cf. **37**, p. 463 *et passim*], and concludes with suggestions concerning further lines of research.

Johnson (T.). **Plant disease control in Western Canada, with particular reference to small grains.**—*Z. PflKrankh.*, **64**, 7–10, pp. 625–631, 1957. [21 ref.]

A review of past and present practices used in Canada, including exclusion of infected material, eradication of intermediate hosts, direct protection by chemicals or hot-water treatment, and immunization by breeding. In conclusion reference is made to new cereal vars. and the relation of agricultural practices to disease control.

Ganhão (J. F. P.). **Notas sôbre a desinfecção de sementes.** [Notes on the disinfection of seeds.]—*Agros*, **40**, 5, pp. 269–283, 1957. [21 ref.]

A review of the literature, together with a description of the principal chemical, physical, and antibiotic seed disinfection processes for cereals, from the Laboratório de Patalogia Vegetal 'Verissimo de Almeida', Lisbon.

Gustavsson (A.). **1957 års inventering av stråsädesrost.** [Cereal rust inventory for the year 1957.]—*Växtskyddsnotiser, Stockh.*, **22**, 3, pp. 43–45, 2 fig., 1958.

Between Sept. 1957 and the spring of 1958, 460 samples were analysed. As in the previous year physiologic races 21 and 34 of wheat black rust [*Puccinia graminis*] predominated in the 60 collections, mostly from Uppland, Småland, and Västergotland [cf. **36**, p. 754]. One collection was made in Norway and 4 samples were sent from Finland.

There is some uncertainty regarding last year's determinations (and possibly those for 1957 also) of races of wheat brown rust [*P. triticina*] as 77 and 20, since samples sent to Brunswick, Germany, for confirmation were there determined as 17 and 52. Further studies are in progress to settle the question. During 1957 race 57 preponderated.

Yellow rust of wheat [*P. glumarum*] was collected in some 10 localities from Scania to Ångermemland and in 3 in S. Norway; the identity of the races is under investigation at Brunswick.

Races 6 and 7 of black rust of oats [*P. graminis*] were the most widespread in 72 samples, the others represented being 3 and 4. The disease was not observed N. of Uppland and Dana.

As in 1956, races 228 and 231 of crown rust of oats [*P. coronata*] were the most frequent in 162 collections made as far N. as Västerbotten, 7 in Norway, 2 in Denmark, and 1 submitted from Finland. About 20 races were differentiated altogether.

The paper concludes with a brief discussion of the climatic factors responsible for the reduced intensity of black and brown rusts of wheat and the surprising increase of black and crown rusts of oats in 1957 as compared with 1956.

Haunold (E.). **Factors affecting the virus content of Cheyenne Wheat infected by Wheat streak mosaic.**—*Phytopathology*, **48**, 8, pp. 411–414, 3 graphs, 1958.

At the University of Nebraska, Lincoln, max. conc. of wheat streak mosaic virus

in wheat, as determined by infectivity assays, was attained in 10 days at 24° C., 20 at 20°, and at 12° the level remained low for 30 days. Day length and light intensity did not appreciably affect virus content. Plants with 630 and 1,050 p.p.m. N in the nutrient solution supplied to sand cultures contained more virus 10 days after inoculation than those with 70 p.p.m., and those with P at 547 p.p.m. more than at 273 or 10, though after 20–30 days differences were not so marked. K had little influence on virus content.

Brakke (M. K.). **Properties, assay, and purification of Wheat streak mosaic virus.** —*Phytopathology*, **48**, 8, pp. 439–445, 1958.

In these studies at the University of Nebraska wheat streak mosaic virus [cf. **35**, p. 884; **38**, p. 72] was partially purified by density-gradient centrifugation and zone electrophoresis [cf. **35**, p. 529]. Infectivity assays were carried out by determining the percentage of infected plants after inoculation with virus from a dilution series. The loglog of the inverse of the fraction of plants remaining healthy was plotted against log. conc. to give a straight line with a slope of 1; the statistics involved are discussed in detail. Extracts from healthy wheat added to the purified virus increased the infectivity titre but decreased the stability, which was, however, unaffected by addition of 1% sucrose. A loss of $\frac{2}{3}$ of the virus occurred during heating for 1 hr. at 40° C. The virus has a tendency to aggregate when a certain degree of purity has been attained.

Brakke (M. K.) & Staples (R.). **Correlation of rod length with infectivity of Wheat streak mosaic virus.**—*Virology*, **6**, 1, pp. 14–26, 3 fig., 1 graph, 1958.

At Nebraska Agricultural Experiment Station, Lincoln, fractions obtained from a sample of wheat streak mosaic virus by zonal centrifugation, equilibrium zonal centrifugation, and zone electrophoresis were examined for infectivity. Rods shorter than 650 mμ were not infectious.

Watson (I. A.) & Luig (N. H.). **Widespread natural infection of Barberry by Puccinia graminis in Tasmania.**—*Proc. Linn. Soc. N.S.W.*, **83**, 2 (387), pp. 181–186, 1 map, 1958.

Most of the rust recovered in the summer of 1956–7 from heavily infected *Berberis vulgaris*, which is widespread throughout Tasmania, resembled *P. graminis secalis*, but *P.g. tritici* was also found. The widespread occurrence of *Agropyron repens*, markedly susceptible to *P.g. secalis*, is considered to influence the prevalence of this f.sp. throughout the island.

Watson (I. A.) & Luig (N. H.). **Somatic hybridization in Puccinia graminis var. tritici.**—*Proc. Linn. Soc. N.S.W.*, **83**, 2 (387), pp. 190–195, 1958.

The great diversity of hybrids of *P.g. tritici* [**37**, p. 767] from mixtures of spores of races red 111 and orange NR-2 [**37**, p. 30] inoculated on screening vars. of wheat at Dept Agric., Sydney, could not be explained solely by nuclear exchange. A prevalent field strain was isolated from spore mixtures of 2 other strains. Somatic hybridization on wheat, sexual hybridization on barberry [see above], and mutation are listed as the main sources of variation.

Hougen (F. W.), Craig (B. M.), & Ledingham (G. A.). **The oil of Wheat stem rust uredospores. I. The sterol and carotenes of the unsaponifiable matter.**—*Canad. J. Microbiol.*, **4**, 5, pp. 521–529, 1958.

An account of investigations on *Puccinia graminis* at the Prairie Regional Laboratory, Saskatoon, Saskatchewan.

Jain (A. C.) & Pelletier (R.-L.). **Effects of rust infection on the carbohydrate metabolism of Wheat seedlings.**—*Nature, Lond.*, **182**, 4639, pp. 882–883, 1 fig., 1958.

In studies at McGill University, Quebec, seedlings of Gabo 54 wheat, resistant (reaction type 1) to race 34 of stem rust (*Puccinia graminis* f.sp. *tritici*), and susceptible Little Club (reaction type 4) were grown in nutrient solution and inoculated at the 2-leaf stage on both leaves. Seven days later the seedlings and healthy controls were placed in an atmosphere enriched with C^{14} dioxide in the light for 1 hr. At least 9 radioactive bands were detected on chromatograms from all seedlings and 1 additional band was present on those of the extract of infected Little Club leaves. This band split into 2 with prolonged irrigation of the paper, and the compound in one band was found to be sedoheptulose; the other was not identified.

All the sugars identified had previously been reported from wheat leaves, except maltose and sedoheptulose. In general, the relative radioactivities of the sugars were increased by infection. Sucrose was an exception, its radioactivity being decreased.

Lupton (F. G. H.) & Macer (R. C. F.). **The breeding of disease-resistant winter Wheats.**—*Agriculture, Lond.*, **44**, 11, pp. 540–544, 2 pl., 1958.

A popular account of work at the Plant Breeding Institute, Cambridge, on yellow rust (*Puccinia glumarum*) [**37**, p. 653 *et passim*]. Selections from crosses of Cappelle Desprez, Hybrid 46, and Ministre with Yeoman and Holdfast show particular promise.

Breeding for resistance to loose smut (*Ustilago tritici* [*U. nuda*: loc. cit.]) has only recently begun. Investigations are in progress to discover the genetical basis of resistance to the 3 known races [**35**, p. 668] shown by Cappelle Desprez.

The primitive spp. *Triticum timopheevi* and *T. carthlicum* are being used as sources of resistance to mildew (*Erysiphe graminis*) [cf. **36**, p. 91], in particular a back cross hybrid from the U.S.A. (C.I.12633) [**36**, p. 522] which crosses readily with the bread wheats. The importance of eyespot (*Cercosporella herpotrichoides*) [**37**, p. 154] has only recently been appreciated: there is no evidence of physiological races.

Duran (R.). **Dwarf bunt of Wheat and Grasses.**—*Bull. Calif. Dep. Agric.*, **46**, 4, pp. 276–280, 3 fig., 1957. [Received 1958.]

A short account of *Tilletia contraversa* and its control [**37**, p. 275 *et passim*]. It was recently detected in herbarium material collected near Jacksonville, Tuolumne county, California, in 1917, but has not been found in the State since [cf. **36**, p. 392].

Kanzler (K.). **Untersuchungen uber die Verbreitung des Zwergbrandes (Tilletia contraversa Kühn) in Bayern und Bekämpfungsmaßnahmen.** [Studies of the distribution of dwarf bunt (*T. contraversa*) in Bavaria and control measures.] — *Jb. bayer. Landw.*, **35**, 4, pp. 454–492, 2 fig., 4 maps, 1958. [61 ref.]

Field inspections in 1953 and data from the seed recognition authorities for 1951–53 point to the Jura, Gauboden, and Niederbayisches Hügelland districts as the principal centres of infection of wheat by *T. contraversa* in Bavaria [cf. **36**, p. 690]. Curative and preventive crop rotations are recommended.

Todorova (Vera). От кога се среща **Tilletia brevifaciens Fischer** в България? [When did *T. brevifaciens* first occur in Bulgaria?]—*Bull. Inst. bot., Sofia*, **6**, pp. 351–361, 2 fig., 1958. [Russian and English summaries.]

Dwarf bunt of wheat is identified as *T. brevifaciens* and not *T. contraversa* [**37**, p. 326], as it has not yet been found on any wild grasses. It appears to have been

present in the country in 1907 and possibly earlier. The disease is most widespread in the districts of Vidin, Tirnovo, Ruschuk, and Kolarovgrad and in some years incidence in certain localities may reach 30–40%. Cross-inoculations to wheat, rye, and barley with *T. brevifaciens*, *T. secalis*, and *T. pancicii* from the 3 hosts, respectively, showed that each was restricted to its own host.

Tammen (J.). **Pathogenicity of Fusarium roseum to Carnation and to Wheat.**—*Phytopathology*, **48**, 8, pp. 423–426, 1958.

Further details are given from the University of California, Berkeley, of observations already noticed [**33**, p. 723]. Of 62 clones of *F. roseum*, many pathogenic to wheat also attacked carnation, and vice versa, and several from other plants attacked both hosts. It is considered that the name *F. roseum* f. *cerealis*, distinguishing pathogenic from the saprophytic forms of *F. roseum*, should be applied to the pathogen of both Gramineae and *Dianthus* spp.

Frecha (J. H.). **Comportamiento de Cebadas con respecto a la población parásita de Helminthosporium teres presente en Argentina. Herencia de los factores de resistencia a Helminthosporium teres que poseen las variedades de Cebada Rojo, Hoyo Epuyén y Hordeum spontaneum.** [Behaviour of Barleys in regard to the parasitic population of *H. teres* in Argentina. Inheritance of resistance factors to *H. teres* of the Barley vars. Rojo, Hoyo Epuyén and *H. spontaneum*.]—*Rev. Invest. agríc., B. Aires*, **12**, 1, pp. 41–55; pp. 91–95, 1958. [English summary to 2nd paper.]

Of 600 barley vars. tested at the Instituto de Fitotecnía, Buenos Aires, for resistance to *H.* [*Pyrenophora*] *teres* [**36**, p. 95; **37**, p. 716], Hoyo Epuyén gave outstanding results and was also resistant to *Puccinia hordei* [loc. cit.]. C.I.4493, Manchu C.I.4795, Tifang C.I.4407–1, and San Carlos also showed good resistance, and to a lesser degree Abyssinian C.I.1243, C.I.4532, Plush, Rojo, and *Hordeum spontaneum*.

In a study of the inheritance of resistance to *P. teres* in Rojo and *H. spontaneum* resistance tests were made on F_2 populations and F_3 families from crosses to susceptible vars. Segregation ratios indicated that in both there is only 1 dominant factor for resistance. All plants from Rojo × *H. spontaneum* were resistant, likewise no F_3 family from this cross showed any segregation, indicating a close relationship between the resistance factors present in both parents. Tests of the behaviour of F_2 populations from crosses of Hoyo Epuyén and susceptible vars. showed that this var. also carries a single dominant resistance factor.

Davies (D. R.) & Wall (E. T.). **Artificial mutagenesis in plant breeding.**—*Nature, Lond.*, **182**, 4640, pp. 955–956, 1958.

In attempts at the Radiation Laboratory, Wantage, Berks., to produce mutants of the barley var. Proctor, resistant to *Erysiphe graminis* f.sp. *hordei*, dormant seeds were exposed to 10,000 rads of γ-rays from a Co^{60} source or to $2{\cdot}2 \times 10^{12}$ thermal neutrons/sq. cm. and immediately sown in field plots. At the 2-leaf stage the plants were inoculated with conidia previously collected by suction pump from control plants and stored in talc at 3° C. No viable R_2 plant was found to exhibit any degree of resistance: susceptible controls developed 100% infection and resistant controls 'little sign of infection'. These results are strikingly at variance with those of Hänsel & Zakovsky with Volkorn barley [**36**, p. 313], indicating the unreliability of the method at present, and suggesting that for a programme of mutation breeding a thorough knowledge of the genotype is essential. The authors calculate that there are probably many hundreds of loci involved in the determination of mildew resistance in Volkorn barley.

Průša (V.). **Die sterile Verzwergung des Hafers in der Tschechoslowakischen Republik.** [Sterile dwarfing of Oats in the Czechoslovak Republic.]—*Phytopath. Z.*, **33**, 1, pp. 99–107, 6 fig., 1958.

From the Tschechoslowakische Akademie der Landwirtschaftswissenschaften, Praha-Ruzyne, a serious new disease of cereals, particularly oats, found in the hill country of Moravia and Bohemia, is reported. The losses caused by the rapid spread of this hitherto unknown disease reached a catastrophic scale in 1956. Infected oat plants hardly grew to a third of their normal height, tillering was more profuse, and the flowers were heavily damaged, the panicles not developing at all or only partially, but even where the shoots were intact their regularity and symmetry were disturbed. One of the 1st field symptoms, apart from dwarfing, was a yellowing of large areas of the leaves at the base of the youngest leaves, followed mostly by a very noticeable anthocyanin staining, progressing from the tips of the uppermost leaves downwards. The symptoms on barley and wheat are largely similar. Rye appears susceptible but suffers little damage. The name 'sterile dwarf virus disease of oats' is proposed.

The disease was first described tentatively as a virus disease, on the basis of an analysis of the symptoms, mode of dissemination, and other features, in an official document in July 1956. In the growing season of 1957 it became apparent that the virus was a new one; its spread was specifically connected with the occurrence of the cicada *Calligypona* [*Delphacodes*] *pellucida*. It is persistent in the vector and apparently belongs to the group of yellows viruses. Grafting and electron-microscope investigations have given important data concerning the new virus, which is neither soil- nor seed-borne. In a preliminary control experiment one treatment of a field of oats in the 1st half of June with the systemic insecticide sytam (45% active material OMPA schradan) induced a 28% reduction of infection, with 111% increase in the number of healthy plants compared with untreated areas.

Stewart (D. M.) & Cotter (R. U.). **A new and virulent culture of Oat stem rust.**—*Phytopathology*, **48**, 7, pp. 389–390, 1958.

Race 13A of *Puccinia graminis* var. [f.sp.] *avenae* was found on Rodney oats in a barberry infested area near Ithaca, New York [**37**, p. 711; **38**, p. 1].

Murphy (H. C.), Zillinsky (F. J.), Simons (M. D.), & Grindeland (R.). **Inheritance of seed color and resistance to races of stem and crown rust in Avena strigosa.**—*Agron. J.*, **50**, 9, pp. 539–541, 1958.

Reciprocal crosses of vars. C.D.3820 and C.I.4748 were studied at the Crops Research Division (U.S. Dept Agric.), Cereal Crops Division (Canada Dept Agric.), and Iowa Agric. Exp. Sta. Segregations for reactions to races 6, 7, 7a, and 8 of *Puccinia graminis* f.sp. *avenae* indicated that the same gene or genes determined resistance to all 4. F_2 segregation indicated that some C.D.3820 parental plants possessed 2 independent dominant genes for resistance to all the races, but the genotype of other parental plants of this var. could not be interpreted on a factorial basis.

The same segregation for reaction to races 202 and 258 of *P. coronata* var. [f.sp.] *avenae* indicated that resistance to both was conditioned by the same genes. F_2 segregation showed some C.D.3820 parental plants to have 3 independent dominant genes for resistance to the 2 races, while others had a single dominant: both parents and the F_3 population were resistant to the new virulent race 276, indicating that both parent vars. may have the same resistance gene or genes.

Griffiths (D. J.). **Physiological specialisation of Oat crown rust (Puccinia coronata Corda f.sp. avenae (Erikss. & Henn.) Erikss.).**—*Trans. Brit. mycol. Soc.*, **41**, 3, pp. 373–384, 1958. [42 ref.]

The pathogenic reactions of 13 physiologic races of *P. coronata* [cf. **36**, p. 396]

identified during 1949–53 at the Welsh Plant Breeding Station, Aberystwyth, from 24 uredospore collections are presented; 10 of these (96–100 and 271–275) proved to be new. The data indicated that the race population changes considerably each season. The sudden occurrence of the 2 new races 274 and 275 in 1952, capable of attacking the hitherto entirely resistant Bond and Victoria, was notable. They were observed in a nursery of these 2 vars. and their progeny, the resistance of which to other races benefited the 2 races in question, an instance of host influence on selection.

It was found that the fungus could overwinter in the uredospore state, which perpetuates existing races. It is suggested that new biotypes arise from vegetative fusion of dikaryotic hyphae [cf. **35**, p. 596], but there is no evidence that long exposure to abnormal conditions causes heritable changes.

It may well be that breeding for 'moderate' rather than 'high' resistance would be less highly selective on the rust population and thus counter the rapid propagation of new races that nullify work of the breeder.

Vatolkina (Mme K. A.). Влияние предпосевной обработки семян на рост и развитие яровых зерновых культур у засушливой зоне Ставропольского края. [The influence of presowing treatment of seeds on the height and development of spring cereal crops in the arid areas of Stavropol'.]—Бюл. науч.-техн. инф. Ставроп. Н.-и. Ин-та с.-х. [*Bull. nauch.-tech. inf. Stavropol' Nauch.-issled. Inst. s.-kh.*], *1956*, 1–2, pp. 47–51, 1956. [Abs. in *Referat. Zh. Biol., 1958*, 8, p. 186, 1958.]

Tests at the Stavropol' Agricultural Scientific Research Institute, with different chemicals against loose smut [*Ustilago avenae*: **34**, p. 145] of oats, showed that granosan+BHC and granosan+formalin (1:300) gave the best results. Details of the height, germination, and vigour of growth, which were increased as a result of the treatment, are tabulated.

Empson (D. W.). **'Blast' produced by the artificial defoliation of Oats.**—*Plant Path.*, **7**, 3, pp. 85–87, 2 fig., 1958.

In an experiment at the National Agricultural Advisory Service, Wolverhampton, to ascertain whether a sudden reduction of the leaf area might induce 'blast' disease of oats [cf. **30**, p. 224], a commercial crop of Sun II was divided into 4 blocks of 8 plots and (starting 29 days after sowing) on 8, 15, 22 May, 4, 19, 26 June, and 3 July the plants of 1 plot in each block were defoliated, every leaf being cut about $\frac{1}{4}$ in. above the ligule.

On 9 July when all the panicles were fully emerged it was apparent that severe blast had been induced in the plants defoliated on 19 or 26 June. A steady increase in the mean numbers of fully formed spikelets/1 ft. of row corresponded with the lateness of defoliation, except that counts for 19 and 26 June were approximately 100 spikelets below the general trend, presumably due to blast.

The evidence indicated that blast is a sign of reduced vitality at a critical time and might be expected to arise from such causes as insect attack or unfavourable weather, though not from factors operative throughout the life of the plant, such as mineral deficiency.

Koehler (B.). **Pericarp injuries in seed Corn. Prevalence in dent Corn and relation to seedling blight.**—*Bull. Ill. agric. Exp. Sta.* 617, 72 pp., 13 fig., 4 graphs, 1957. [Received 1958.]

This comprehensive study is based on data obtained since 1942, some of which has been noticed [**34**, p. 293]. Crown injury was found to influence plant vigour more than injury over the plumule, resulting in seedling blight due to *Pythium debaryanum* and *Penicillium oxalicum*. Subsequent striping of leaves may be related to

pericarp injury. *Pythium debaryanum* and *Penicillium oxalicum* were the fungi chiefly associated with seedling blight resulting from pericarp injury, the latter fungus being more active, causing damage even when there was slight crown injury. *Aspergillus flavus* and *A. tamarii* in inoculation experiments caused more virescence than seedling blight.

The value of seed treatments was very apparent, averaging 10% increased yield with commercial seed, but did not control *Pythium* rot of seminal roots, nor *Penicillium oxalicum* leaf blight in infested soil after the 2–3-leaf stage was reached. The ranking of inbred seedlings for resistance to seedling blight varied with the condition of the pericarp. In hybridization a strong maternal influence on resistance to seed blight was evident.

Atkins (J. G.) & McGuire (J. U.). **The hoja blanca disease of Rice.**—*F.A.O. Pl. Prot. Bull.*, **6**, 11, pp. 161–166, 1958. [13 ref.]

The authors briefly recapitulate the information that has recently become available on 'hoja blanca' virus disease of rice [**37**, p. 718] in various countries [**37**, p. 282], giving the geographical distribution, losses, symptoms, host range, factors influencing the development of the disease, insect vectors, and varietal resistance. In Florida losses of 40–75% have been common in individual fields. *Sogata orizicola* is reported to be an important vector in Cuba.

[This paper also appears in *News Lett. int. Rice Comm.*, **7**, 3, pp. 1–7, 1958.]

Todd (E. H.). **Observations of the hoja blanca disease of Rice in Florida.**—*Plant Dis. Reptr*, **42**, 9, pp. 1037–1038, 2 fig., 1958.

Mature plants of C.I.9016 rice severely infected by 'hoja blanca' virus were collected from the field and maintained in the greenhouse at the U.S. Sugarcane Field Station, Canal Point, Florida, as a source of inoculum. After cutting back no symptoms appeared on the 1st stubble crop or on the 2nd following a further cutting, the panicles of both crops being normal. This non-persistence of symptoms has been observed in the field [Atkins & Adair: **37**, p. 282].

Malaguti (G.) & Ángeles (N.). **Ensayos preliminares sobre el uso de insecticidas en el control de los vectores de la 'hoja blanca' del Arroz.** [Preliminary trials in the use of insecticides for the control of the vectors of 'hoja blanca' of Rice.]—*Agron. trop., Maracay*, **7**, 3, pp. 161–163, 1957.

In a trial on a commercial field of Bluebonnet rice at Acarigua, Estado Portuguesa, Venezuela, the systemic meta*iso*systox (Bayer, Carácas), applied from aircraft 20, 50, and 78 days after germination, reduced infection by 'hoja blanca' virus [**37**, p. 718] to 3·68% (untreated 22·56%) and increased yield and wt./vol. of the grain.

Johnston (A.). **Diseases of Padi.**—*Malay. agric. J.*, **41**, 1, pp. 10–17, 10 pl., 1958.

Further information with good illustrations is given on the symptoms and control of the chief diseases of rice in Malaya [**38**, p. 55], viz. brown spot (*Helminthosporium oryzae*) [*Cochliobolus miyabeanus*], blast (*Piricularia oryzae*), narrow brown leaf spot (*Cercospora oryzae*) [**34**, p. 251; map 71], leaf smut (*Entyloma oryzae*) [cf. **33**, p. 280], prevalent but not of economic importance, sheath blight (*Corticium solani*) [**32**, p. 118], stem rot (*Sclerotium oryzae*), present in scattered localities only, false smut (*Ustilaginoidea virens*), 'penyakit merah' [cf. **37**, p. 352], and minor diseases, including *Neovossia horrida* [cf. map 75], which is not common.

Chevaugeon (J.) & Ravisé (A.). **Régime de l'eau et maladies parasitaires du Riz en Afrique Occidentale.** [The water regime and parasitic diseases of Rice in

West Africa.]—*J. Agric. trop. Bot. appl.*, **4**, 3–4, pp. 143–151, 1957. [*Biol. Abstr.*, **32**, 9, p. 2670, 1958.]

The lack of water in the Richard Toll area of Senegal and its excess near Adiopodoumé, Ivory Coast, are both conducive to parasitic diseases of rice [cf. **37**, p. 351]. At Richard Toll over 263 species of organisms were detected on grain, of which the most important were *Rhizopus nigricans* [*R. stolonifer*], *Helminthosporium oryzae* [*Cochliobolus miyabeanus*], *Curvularia maculans*, *Fusarium nivale* [*Calonectria nivalis*], and *Phyllosticta glumarum*. Even under conditions highly favourable to infection, however, under 5% of the seedlings become affected. The chief cause of seedling loss was anaerobiosis, resulting from sowing in deep water.

Terui (M.) & Kagawa (H.). **The inhibiting effect of antibiotics on the conidial germination of the Rice blast fungus.**—*Bull. Fac. Agric. Hirosaki Univ.* 4. pp. 29–35, 1 graph, 1958. [Japanese. Abs. from English summary.]

In a comparison of the efficiency of 9 antibiotics and the organo-mercurial fumiron against *Piricularia oryzae* only actidione was better and aureothricin [cf. **36**, p. 487] equal to it, the concs. reducing conidial germination by over 50% being 0·01–0·05, 0·1–0·5, and 0·1–1 μg./ml., respectively.

Iizuka (H.). **Studies on the microorganisms found in Thai Rice and Burma Rice. Part II. On the microflora of Burma Rice.**—*J. gen. appl. Microbiol.*, **4**, 2, pp. 108–119, 2 fig., 1 diag., 1 map, 1958.

In this account [cf. **37**, p. 162], following a visit to Burma in 1954–5 and work at the Institute of Microbiology, University of Tokyo, it is stated that there is less deterioration in unhusked rice than in polished during storage. *Aspergillus*, *Penicillium*, and *Streptomyces* spp. were chiefly responsible, some of the last-named proving poisonous to mice.

Hafiz (A.). **Some studies on long smut of Sorghum.**—*Pakist. J. sci. Res.*, **10**, 3, pp. 83–87, 1958.

Information is summarized on the morphology of *Tolyposporium ehrenbergii* [**37**, p. 584], its modes of perpetuation, and factors influencing the incidence of long smut at Lyallpur. Seeds coated with spores and sown in healthy soil produced 10–22% diseased heads. With healthy seeds sown in contaminated soil the incidence of smutted heads was heavier (32–70%) when infestation occurred after the previous harvest than when spores were mixed with the soil at sowing (20–28%). Secondary infection was shown to be caused either by spores shed in the soil the previous year or by those developing in the sacks of the current season's harvest. Under local conditions long smut generally appears in April- or May-sown stands, when the mean soil temperature (25–34° C.) and rainy weather favour the development of the pathogen.

Yu (T.-F.), Hsu (H.-K.), & Pei (M.-Y.). **Studies on the red-leaf disease of the Foxtail Millet (Setaria italica (L.) Beauv.) II. Cultivated and wild hosts of Millet red-leaf virus.**—*Acta. phytopath. sinica*, **4**, 1, pp. 1–7, 1958. [Chinese. Abs. from English summary.]

In further investigations [cf. **37**, p. 233] on the host range of the virus, involving 50 cultivated and wild gramineous spp., 45 spp. (listed) proved to be hosts, 11 being symptomless carriers. The host range differed from those of barley yellow dwarf or sugarcane mosaic virus; neither sorghum nor sugarcane was susceptible. A new gramineous virus therefore appears to be involved, intermediate in host reactions between the barley yellow dwarf and sugarcane mosaic viruses, but more closely related to the latter.

Olson (E. O.). **Responses of Lime and Sour Orange seedlings and four scion-rootstock combinations to infection by strains of the tristeza virus.**—*Phytopathology*, **48**, 8, pp. 454–459, 1958.

In further studies by the U.S. Dept Agric. and Texas Agricultural Experiment Station, Weslaco [cf. **36**, p. 22], sour orange seedlings were bud inoculated with 1 severe and 7 mild strains of citrus tristeza virus from 8 citrus vars. introduced into Texas from various centres before 1943, but obtained for this experiment from inoculated Mexican lime seedlings [**37**, p. 476]. Some of the strains causing mild symptoms on lime stunted sour orange, others did not. The response of Valencia orange and Red Blush grapefruit tops to 2 of the mild strains and the severe strain varied with the root stock and virus source; trees on sour orange were stunted by the severe strain but not those on Cleopatra mandarin. Symptoms typical of the virus source appeared on indexing.

Of the 7 mild strains only Meyer lemon A protected lime seedlings from infection by the severe strain. When lime seedlings were bud inoculated simultaneously with mild and severe strains severe symptoms were more in evidence when the severe strain was in the upper inoculum bud than in the lower (about 2 in. away). The source plant of the mild strain also affected the occurrence of severe symptoms.

When lime scions carrying the Meyer lemon A mild strain were grafted to lime seedlings infected with the severe strain no severe symptoms had appeared in the scion in 20 months, but when, 4 months after grafting, portions of these scions were indexed on lime seedlings, 25 out of 37 showed severe symptoms, indicating that the severe strain had moved into the grafted top.

Da Silveira (G. G.). **Algumas considerações sôbre a exocorte dos Citrus.** [Some considerations on exocortis of Citrus.]—*Bol. fitossanit.*, **7**, 1–2, pp. 11–19, 4 fig., 1957.

This is a description of exocortis virus disease of citrus, the incidence of which has been increasing steadily during the last 3 years in the State of S. Paulo, Brazil [**36**, p. 317].

Loprieno (N.) & Bugiani (A.). **Conservazione della forma picnidica del Deuterophoma tracheiphila Petri in coltura e innovazioni nella tecnica di infezione su piantine di Arancio Amaro.** [Preservation of the pycnidial form of *D. tracheiphila* in culture and modifications in the technique of infection of Sour Orange seedlings.]—*Phytopath. Z.*, **32**, 4, pp. 341–351, 7 fig., 1958. [German and English summaries.]

At the Instituto di Ricerche Agrarie, Montecatini Society, Florence, recently isolated DPR strains of *D. tracheiphila* [**29**, p. 464; **34**, p. 33] retained their power to produce pycnidia and pycnospores when grown on lemon tree sawdust, though they lost it on carrot dextrose agar. Type R strains [loc. cit.] did not produce pycnidia on sawdust medium. Two methods of producing infection on bitter orange seedlings with pycnospores either hypodermically inoculated at the base of the petiole or placed on small lesions on the leaf surface made with a fine needle are described.

Henrard (P.). **Colletotrichum coffeanum Noack.**—*Agricultura, Louvain*, Ser. 2, **5**, 1, pp. 39–55, 1957. [Flemish and English summaries. Received Oct. 1958.]

In the Kivu area of the Belgian Congo *Glomerella cingulata* [cf. **34**, p. 583; **37**, p. 513] causes the most serious disease of the aerial parts of Arabian coffee. The damage caused and the factors influencing the development of the fungus are briefly described, followed by a full account of spraying tests during 1954–56 against the brown blight form of the disease on the leaves. Products judged sufficiently active on the resistant Local Bronze Inéac var. were then tested on the susceptible

Mbirizi. Spraying (1 l./tree) was carried out at intervals of a fortnight, and some of the tests were continued for 6 months. The results obtained showed that phygon, tersan, perenox, cupronol, cupravit, oleocuivre, parzate, zineb, and fuclasin ultra were insufficiently active.

Captan was active against *G. cingulata* at 0·25%, but the evidence indicated that in the presence of severe infection it should not be used below 0·5%, if 900 l./ha. of spray are applied to trees of average vigour. Fermate at 0·25% gave good results on Local Bronze, though not equal to captan at 5%; the results on Mbirizi were less satisfactory. Tuzet at 0·125 and 0·15% was highly fungicidal, but after 4 applications in 6 weeks the trees showed signs of arsenical poisoning. Further tests are required at lower concs.

Revilla M. (V.) & Juárez G. (L.). **Control de la 'chupadera' del Algodonero mediante fungicidas 1957–58.** [Control of damping-off of Cotton by fungicides 1957–58.]—*Inf. Estac. agríc. 'La Molina'*, **32**, 371, pp. 15–20, 1 graph, 1958.

Experiments by the Departamentos de Fitopatología y Agronomía, La Molina, Peru, showed that rhizoctol gave highly effective control of damping-off of cotton caused by *Rhizoctonia* [*Corticium*] *solani* [**36**, p. 102] (8% damping-off compared with 32% in the control). Brassicol, in use for some time, and PCNB+Hg., of similar composition, were next best (11%). None of these were phytotoxic.

Babayan (A. A.), Karapetyan (K. A.), & Sarksyan (M. A.). Биологическое и антибиотическое обеззараживание семян Хлопчатника от инфекции гоммоза. [Biological and antibiotic disinfection of Cotton seed against gummosis infection.]—Агробиология [*Agrobiology*], *1958*, 5, pp. 101–104, 1958.

In field experiments at the Pan Soviet Agricultural Microbiological Institute, Moscow, cotton seeds were soaked for 20 hr. in the antibiotics (1 l./400 g.) no. 370 (from actinomycetes), polymyxin, and streptomycin against gummosis [*Xanthomonas malvacearum*: **37**, p. 586]. They were also used in dry form, with phytobacterimycin. Polymyxin dry gave better control, increased germination, and 3·6% increased yield, compared with 0·5–1·2% increase with the other antibiotics and granosan.

Logan (C.). **Some observations and experiments on Abyan root-rot of Cotton.**—*Emp. Cott. Gr. Rev.*, **35**, 3, pp. 168–177, 1 pl., 1 graph, 1958.

Investigations in Oct.–Nov. 1957 into the root rot of cotton prevalent in the Abyan area of the Aden Protectorate [**37**, p. 168] showed that the disease was widespread, incidence varying with the locality, but being noticeably greater (up to 30–35% of the plant population) on land continuously under cotton since the scheme began. The 1st wilt symptoms in 1957 on the experimental farm were observed on 7 Oct. on 5–6-week-old plants; wilted plants increased until the 2nd week in Nov., after which incidence decreased markedly and ceased by the end of Dec. One diseased patch in the El Johl district extended over 5 acres.

Affected plants are easily pulled up, the main tap-root usually breaking at a point about 1 ft. below soil level. The outer, cork layer of the root tears readily, and reveals spongy tissue, usually stained brown and composed of separate fibres, resulting from decomposition of the parenchyma of the inner and outer cortex. On the surface of the vascular cylinder, there is a yellowish, granular, resinous substance. The central xylem in recently killed plants is vivid yellow, merging into a deep carmine at about soil level. The rot does not extend much more than 2 in. above soil level, where it ends sharply in a well-defined 'high water mark' with carmine streaks extending to the cotyledonary node. Infection occurs deep in the soil and wilting results from a rapid, upward movement of decomposition, resembling that induced by a soft-rot organism, in the cambium and parenchyma

of the bark to a point above the emergence of the top lateral root. There is little plugging of the vessels of the stem. Crystalline deposits are abundant in the disintegrating parenchyma. The most likely pathogen among the organisms isolated from affected plants is *Pseudomonas solanacearum*, inoculation experiments with which are in progress.

The most important factor predisposing to the disease is probably continuous monocropping, with resultant build-up of infected debris in the soil, combined with a depletion of N. There is also a tendency to over-water. Suggested control measures include soil sterilization, the use of fertilizers, and intercropping.

Anselme (C.). **L'analyse phytosanitaire des semences de Lin.** [The phytosanitary inspection of Flax seed.]—*Bull. tech. Ing. Serv. agric.* 119, pp. 231–234, 1957. [Received Sept. 1958.]

A note on the practice and purpose of flax seed inspection in France.

Anselme (C.). **Étude comparative de différents produits utilisés pour la désinfection des semences de Lin.** [A comparative study of various products used for the disinfection of Flax seed.] —*Phytiatrie-Phytopharm.*, **7**, 1, pp. 3-13, 1958. [29 ref.]

In experiments during 1950–53 at the Station Centrale de Pathologie Végétale, Versailles, flax seed artificially infested with *Ascochyta linicola* [cf. **32**, p. 625] and naturally infected with numerous other fungi sown shortly after treatment with organo-mercury products (dust or oil) received excellent protection; if a soluble material is used the dose may be strong and will immediately exert a fungicidal effect, but will be eliminated in the soil. Less soluble substances exert their effect over a longer period.

If the seed is to be stored for some months it should be treated first with thiram and shortly before sowing with an organo-mercury product, the latter at 20% less than the usual dosage.

Zvyagintseva (Mme E. I.). Новый протравитель семян Льна — 50% - ный ТМТД. [New compound for Flax seed treatment—50% thiram.]—Информ. бюл. Гос. комис. по сортоиспыт. с.-х. культур при М-ве С.-Х. [*Inform. Bull. Gos. Comm. sortoisp. s.-kh. Cult. Minist. S.-Kh.*], *1957*, 4, pp. 18–21, 1957. [Abs. in *Referat. Zh. Biol., 1958*, 9, p. 194, 1958.]

Tests over 3 yr. in U.S.S.R. have shown that treating flax seed with 50% thiram 1½–6 months before sowing did not impair germination and controlled fusariosis [*Fusarium lini*: **36**, p. 187], polysporosis [*Polyspora lini*: **35**, p. 609], and other [unspecified] diseases.

Trojan (Krista). **Fleckenbildung an Blüten durch Botrytis.** [Spotting of flowers by *Botrytis*.]—*Pflanzenschutz*, **10**, 5, pp. 67–68, 2 fig., 1958.

A short, popular note from the Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, Munich, on flower spotting in ornamentals [**36**, p. 245] and flower, stem, and bulb rot of onion caused by *B. cinerea*, with indications for control. 'B 500' and botrysan are recommended.

Vukovits (G.). **Drei für Österreich neue Ringfleckenkrankheiten an Zierpflanzen.** [Three ring spot diseases of ornamentals, new to Austria.] —*Pflanzenarzt*, **11**, 9, pp. 105–106, 6 fig., 1958.

Brief descriptions of peony ringspot virus on peony, an as yet uninvestigated virus causing ringspot on *Helleborus niger*, and a ringspot infection of *Pelargonium peltatum* [**36**, p. 528], transmitted by grafting to *P. peltatum* and *P. zonale*.

Jenkins (J. E. E.). **Greasy blotch of Carnation.**—*Plant Path.*, **7**, 2, p. 76, 1 pl., 1958.

In the winter of 1956–7 greasy spot of carnations, caused by *Zygophiala jamaicensis* [cf. **37**, p. 481], was present in 3 nurseries in the Lea Valley and Bedfordshire, a new record for England. The disease appeared to be serious only during periods of high humidity.

Hartmann (G. C.). **Susceptibility of Clarkia to Synchytrium fulgens.**—*Mycologia*, **50**, 4, pp. 562–569, 22 fig., 1958.

At Purdue University, Lafayette, Indiana, of seedlings of 14 spp. and ssp. of *Clarkia* inoculated with *S. fulgens* [cf. **33**, p. 118] from *Oenothora biennis* 13 were susceptible, and in 11 of these viable zoospores were produced in 10–16 days. Slight evidence of a relationship between host haploid chromosome number and susceptibility was obtained. Abortion of the parasite occurred in 10 species, but mature sporangia were produced in all of these.

Hollings (M.). **Hydrangea ringspot in Britain.**—*J. hort. Sci.*, **33**, 4, pp. 275–281, 1 pl. (9 fig.), 1958.

Hydrangea ringspot virus [cf. **37**, p. 483] was recorded for the 1st time from several localities in England; some infected plants were symptomless. It was transmitted mechanically, but not by *Myzus persicae*, infecting 17 out of 49 plant spp. tested. Except that it did not infect *Dianthus barbatus*, a somewhat variable host, it closely resembled the American virus [loc. cit.]; serologically it proved unrelated to potato virus X.

Brierley (P.) & Travis (R. V.). **A virulent strain of Cucumber mosaic virus from Easter Lily.**—*Plant Dis. Reptr*, **42**, 9, pp. 1034–1036, 1 fig., 1958.

The virus isolated at Beltsville, Maryland, from seedlings of Easter lily [*Lilium longiflorum* var. *eximium*] with prominent brown streaking along the leaf midribs protected zinnia against infection by Price's tester strain of cucumber mosaic virus [**37**, p. 218]. It caused no symptoms on White Queen Easter lily, but was re-isolated. Creole, symptomless when inoculated but carrying mottle [tulip breaking virus: **36**, p. 406] and latent [lily symptomless virus: loc. cit.] infection, developed brown blotches and stripes which coalesced and killed the leaves. Croft, presumed to carry lily symptomless virus, reacted similarly to inoculation but the symptoms were milder.

Udincovs (P.). **Ka noverst dzeltenas Lupinas visanas slimidu.** [The control of Lupin wilt.]—*Padomju Latv. Kolchoznieks.*, *1957*, 9, p. 23, 1957. [Abs. in *Referat. Zh. Biol.*, *1958*, 9, p. 192, 1958.]

A wilt caused by *Erwinia phytophthora* and *Fusarium* sp. developed throughout the 350 ha. in Latvia sown with imported seeds of yellow lupin.

Griffiths (E.) & Siddiqi (M. A.). **Microbial antagonism of Fusarium culmorum.**—*Nature, Lond.*, **182**, 4640, p. 956, 1958.

In a survey of soil- and root-invading fungi in swards of *Lolium perenne* at the Dept of Agricultural Botany, University of Wales, Aberystwyth, particular attention was paid to *F. culmorum*, regularly isolated from the soil and the roots [cf. **36**, p. 341]. Its marked seasonal variation was related neither to soil temp. nor to soil moisture, taken separately. At low soil moisture (40% moisture holding capacity) and up to 10° C. *F. culmorum* was dominant over *Trichoderma viride*, also abundant and completely dominant above 10°.

A bacterium regularly present at the root surface, particularly on healthy ones,

was found to be antagonistic to *F. culmorum* on agar; it clearly inhibited the development of symptoms of fungal infection (root browning and withering of the leaves) when both were inoculated together into sterilized soil sown with the grass.

Brandes (J.) & Quantz (L.). **Elektronmikroskopische Untersuchungen des Weißkleevirus und des Steinkleevirus.** [Electron microscope studies of the White Clover and Sweet Clover viruses.]—*Arch. Mikrobiol.*, **26**, 4, pp. 369–372, 2 fig., 2 graphs, 1957.

The normal lengths of particles of these viruses were determined as 476 and 616 mμ, respectively. Both are therefore clearly distinguishable from *Phaseolus* viruses 1 and 2 [bean mosaic and bean yellow mosaic viruses: **36**, p. 532].

Athow (K. L.) & Davis (R. L.). **Inheritance of resistance to southern anthracnose in Red Clover.**—*Phytopathology*, **48**, 8, pp. 437–438, 1958.

A more detailed account of studies at the Purdue Agricultural Experiment Station, Lafayette, Indiana, concerning resistance to *Colletotrichum trifolii* [**36**, p. 407].

Uspenskaya (Mme G. D.) & Dukhovich (V. M.). Бактериальные пятнистости Клевера. [Bacterial spot on Clover.]—Вестн. Моск. Универ. [*Vestn. Mosk. Univ.*], Ser. biol., *1958*, 2, pp. 89–96, 1958.

Investigations by the Faculty of Lower Plants, Moscow University, in the Kuntsev district in 1955, revealed 50% infection of clover by *Pseudomonas trifoliorum* [*P. syringae*: cf. **14**, p. 16]. Infection did not decrease germination even when clover seeds were soaked in a bacterial suspension for several hours. An isolate from red clover was non-pathogenic to sainfoin, lupin, lucerne, vetchling [*Lathyrus* sp.], sweet clover [*Melilotus* sp.], vetch, and white clover. All strains of *P. syringae* have the same biochemical properties and differ only in pathogenicity. The biological properties were compared with 10 other spp. of bacteria parasitic on legumes.

Schmiedeknecht (M.). **Untersuchungen zur Spezialisierung von Pseudopeziza medicaginis (Lib.) Sacc.** [Studies on the specialization of *P. medicaginis*.]—*Phytopath. Z.*, **32**, 4, pp. 433–450, 4 fig., 1 graph, 1958. [English summary. 27 ref.]

Following further studies at the Institut für Phytopathologie, Aschersleben, Germany, the author clearly defines *P. medicaginis* [**36**, p. 766]. The fungus forms overwintering apothecial primordia which do not develop ascospores during this stage. There is a range of variation in the size of the apothecia, asci, ascospores, and the leaf spots, but even so the strains on *Medicago lupulina* differ clearly from those on *M. falcata*, *M. sativa*, and *M. varia*.

Seedlings of 20 spp. and ssp. of *Medicago*, 38 strains of cultivated lucerne of different provenance, and various other leguminous herbage plants were mass-inoculated with *P. medicaginis* by placing flats containing the plants in a glass trough covered by a mesh bearing infected plant remains kept moist under damp filter paper and glass. Field observations confirmed the conclusions arrived at in the greenhouse. As a result, 2 new f. spp., *medicaginis-lupulinae* and *medicaginis-sativae*, are made. These are mutually exclusive on their main host plants and differ also in morphological characters. The *Medicago* spp. display qualitative and quantitative differences in their reaction to attack by these f.sp. and may be divided into 4 types according to the size of the leaf spots and the absence or presence of apothecia. *M. rigidula* is the only sp. that is fully resistant to both f.sp. but there are many other spp. with differences in resistance made evident by gummous demarcations or defence necroses.

Schmiedeknecht (M.). **Pseudopeziza medicaginis (Lib.) Sacc., ein xerophiler pflanzenpathogener Ascomycet.** [*P. medicaginis*, a xerophilic plant-pathogenic ascomycete.]—*Naturwissenschaften*, **45**, 20, p. 525, 1 graph, 1958.

In further experiments [see above] with the temp. maintained at 20° C., the opt. for *P. medicaginis*, a ripe apothecium was placed above an NaCl solution and ascospore ejaculation observed in relation to R.H. Subsequent germination and mycelial growth on an agar film were studied. These processes were definitely inhibited and delayed at 100% R.H. The opt. lay between 99 and 97% but as low as 75·8% (saturated NaCl solution) 20% of the apothecia discharged and the spores produced normal colonies. These findings explain the virtual failure of liquid cultures as a medium for the fungus and its poor growth on fresh agar; on the contrary, it thrives on old, well-dried agar.

Karimov (A. M.). Новый паразит Люцерны—**Ascochyta imperfecta Peck** в Средней Азии. [New parasite of Lucerne—*A. imperfecta* in Central Asia.]—Труд. Ташкентск. с.-х. Ин-та [*Trud. s.-kh. Inst., Tashkent*], *1957*, 8, pp. 71–75, 1957. [Abs. in *Referat. Zh. Biol., 1958*, 9, p. 192, 1958.]

In the spring of 1952 *A. imperfecta* [**37**, p. 497] was isolated from lucerne plant debris in the fields. Full details are given for diagnosing the disease. The source of mass infection was found to be *Medicago coerulea*, which should be destroyed, together with lucerne crop residues.

Patel (A. J.) & Patel (M. K.). **A new bacterial blight of Cyamopsis tetragonoloba (L.) Taub.**—*Curr. Sci.*, **27**, 7, pp. 258–259, 1958.

A description is given of *Xanthomonas cyamophagus* sp. nov. on *C. tetragonoloba* [*C. psoraloides*], found at Anand, India, in 1957 [but cf. **33**, p. 32].

Thiem (H.). **Die Abbaukrankheiten des europäischen Obstbaues.** [The degenerative diseases in European fruit culture.]—pp. viii+174, 93 fig., Munich, Bayerischer Landwirtschaftsverlag, 1957. DM. 23. [364 ref. Received Oct. 1958.]

This useful publication, primarily intended to help nurserymen to raise healthy plants, describes the symptoms of the most important virus diseases of fruit trees and soft fruit in Europe, with some reference to nutritional and other physiological disorders.

Hiemeleers (J.). **De virusziekten bij de fruitbomen.** [Virus diseases of fruit trees.] *Agricultura, Louvain*, Ser. 2, **5**, 1, pp. 15–37, 10 fig., 1957. [French, English, and German summaries. 22 ref. Received Oct. 1958.]

The author (University of Louvain, Belgium) gives descriptions, based partly on the literature and partly on personal observations, of the principal virus diseases of apple, pear, cherry, plum, and peach. Where necessary, attention is drawn to the distinctions between a virus disease, a deficiency disorder, and a physiological disorder.

Wheatley (D.). **A preliminary comparison of the temperature-germination relationships of ascospores and of conidia of the Apple and Pear scab fungi (Venturia inaequalis and V. pirina).**—*Rep. agric. hort. Res. Sta. Bristol, 1957*, pp. 97–104, 3 graphs, [1958].

In May and June 1957 the percentage germination and rate of growth of germ tubes of ascospores and conidia of *V. inaequalis* (from leaves of Cox's Orange Pippin and Bramley's Seedling, respectively) and *V. pirina* (conidia only, from fruitlets of William's Bon Chrétien) were compared at 10, 15, 20, 25, and 30° C. Fresh leaves were held on glass slides in Petri dishes used as moist chambers, and a drop of spore suspension was placed on the upper surface. After the required intervals

(up to 41 hr.) some of the water in the droplets was removed with filter paper and the leaves allowed to dry, after which the germinating spores were removed by a modified collodion film technique [**35**, p. 909] and examined in cotton blue. At each recording 50 spores were observed and results expressed as mean germ tube length/germinated spore.

Percentage germination of conidia of *V. inaequalis* was higher and growth more rapid than for ascospores, and the conidia developed more rapidly than those of *V. pirina*.

Byrde (J. W.), Clarke (G. M.), & Harper (C. W.). **A three-year comparison of captan and lime sulphur as post-blossom fungicides on Cox's Orange Pippin Apples.**—*J. hort. Sci.*, **33**, 4, pp. 244–253, 1958.

Post-blossom captan (commercial at 0·075%) was compared with lime-sulphur (0·75%) following pre-blossom lime-sulphur at Long Ashton Research Station during 1954–56, captan being applied throughout in 1957 on the same plots [see *Rep. agric. hort. Res. Sta. Bristol, 1957*, pp. 93–97, [1958]; and cf. **37**, p. 46]; the trees were on M. II or M. IX rootstocks. The incidence of apple scab (*Venturia inaequalis*) was very low throughout; apple mildew (*Podosphaera leucotricha*) and Cox spot [**35**, p. 902] were more severe with captan, which increased crop weight on M. II rootstock trees by 25 lb./tree (42%), but for M. IX only reduced fruit russeting. With M. II a residual effect from the previous season's spray was indicated in both mildew and weight (both higher after captan).

Martin (J. T.) & Pickard (J. A.). **Spray application problems : XLII. Mercury deposits on Apple fruits and foliage.**—*Rep. agric. hort. Res. Sta. Bristol, 1957*, pp. 76–81, [1958].

Surface deposits of Hg on leaves and fruits, followed throughout the season on Bramley's Seedling trees [cf. **36**, p. 411] under a spray programme of 7 applications of 0·003% phenyl mercuric nitrate, were largely lost by weathering between applications, but there was some penetration of both leaves and fruit. Fruits in a commercial storehouse, harvested from trees similarly sprayed, showed a mean level of contamination of 0·05 p.p.m. Hg, equivalent to 10 μg/apple of 200 g., distributed as follows: peel 2 μg, flesh 8 μg, and core less than 1 μg. Hg was present in the peel and flesh after baking.

Burchill (R. T.). **Observations on the mode of perennation of Apple mildew.**—*Rep. agric. hort. Res. Sta. Bristol, 1957*, pp. 114–123, 6 fig., 1 diag., 1 graph, [1958].

Following a 2-year study of the incidence and development of mildew (*Podosphaera leucotricha* [cf. **37**, pp. 289, 541]) on the buds of Cox's Orange Pippin the author concludes that the most important source of infection is the growth of mycelium into the buds from infected petioles [cf. **6**, p. 732]. Axillary buds were susceptible for approximately 1 month after emergence, before the closure and suberization of the outer scales, whereas terminal buds were susceptible throughout the season; thus modern trends in pruning practice, tending to the removal of fewer terminal buds, allow more carry-over of the disease.

The susceptible period of fruit buds on dwarf shoots appears to be approximately 1 month during May–June. Infected terminal buds were the principal source of infection in the following year. Post-blossom applications of lime-sulphur and karathane [**37**, pp. 666, 725] reduced overwintering infection in fruit buds.

Sharples (R. O.). **The reduction of orchard sources of Gloeosporium disease.**—*Rep. agric. hort. Res. Sta. Bristol, 1957*, pp. 105–114, 1 pl., 2 graphs, [1958. 10 ref.]

After reviewing the literature on the overwintering of *G.* [*Neofabraea*] *perennans*

and *G. alba* [**37**, p. 47] in the orchard and noting that apothecia of *N. perennans* were obtained on overwintered infections in detached wood the author describes the effects of seasonal variations on the susceptibility of pruning wounds [**37**, p. 541] on 2–3-yr.-old shoots of Cox's Orange Pippin to inoculation with spore suspensions of *N. perennans*. Infections always developed in 'terminal' wounds (removal of a shoot just above a bud) and 'snag' wounds (cutting back just below a bud); in spring and summer such wounds were much more susceptible than 'lateral' wounds (removal of a lateral shoot), infections of which, initiated during this period, usually remained smaller, but in Nov. and Dec. they proved equally susceptible. Of lesions initiated in June, July, and Sept. 1957, 40%, 20%, and 75%, respectively, continued to extend through the following winter, but growth of all other lesions initiated between Feb. and Sept. was arrested by the autumn.

The resistance of terminal pruning wounds to the spread of *N. perennans* decreased as the age of the branch increased. All lesions initiated in Feb. 1957 were arrested by the summer, but those on 10% of 1957 and 1956 shoots and on 40% of 1955 and 1954 shoots inoculated in July 1957 extended during the following winter. The depth to which stained spores were sucked into the vessels of lateral wounds 0 hr.–32 days after cutting in Apr., July, and Nov., was studied in relation to the development of lesions in comparable wounds inoculated with viable spores. Apr. and Nov. wounds still showed some suction after 24 hr., July wounds none after 6 hr. Infections from Apr. and July inoculations did not exceed 1·5 cm.; only those of Nov. gave typical cankers. As the duration of susceptibility in the Apr. and Nov. series was roughly parallel to the duration of the period of active suction it is concluded that spores sucked into the vessels are protected from desiccation when they germinate.

A paint containing 0·3% phenyl mercury chloride (PMC) and a suspension in 2% linseed oil emulsion, applied to cankers in mid-March [cf. **34**, p. 601], effected a mean average reduction of 80% in the spore output over the following 7 months. These treatments did not inhibit the spread of the fungus in the host tissue and such use of PMC in general practice would be prohibitive in cost and possibly dangerous to the operators.

Arx (J. A. von). **Die 'Gloeosporien' des Kernobstes.** [The 'Gloeosporia' of pome fruit.]—*Phytopath. Z.*, **33**, 1, pp. 108–114, 4 fig., 1958. [English summary.]

The author considers that *Gloeosporium fructigenum*, the conidial state of *Glomerella cingulata* [**37**, pp. 25, 26], is a *Colletotrichum* sp. without setae. It is mostly a wound parasite. Infection of apple fruit by *Gloeosporium* [*Neofabraea*] *perennans* takes place mainly through the lenticels during summer. *N. perennans* is considered to be identical with *G.* (*N.*) *malicorticis* [**36**, p. 328]; the conidial state is a *Cryptosporiopsis*. *G. album* is considered identical with *Phlyctaena vagabunda*, and this name is preferred. A list of its hosts is given.

Darpoux (H.) & Arnoux (M.). **Actions du pétrole et de l'arséniate de plomb sur la tavelure et la septoriose du Poirier.** [The effects of paraffin and lead arsenate on scab and septoriosis of Pear.]—*Phytiatrie-Phytopharm.*, **7**, 1, pp. 47–50, 1958.

Work at the Station Centrale de Pathologie Végétale, Versailles, indicated that paraffin and lead arsenate both had some effect against *Venturia pirina* and *Mycosphaerella sentina* on pears, but were inferior to standard fungicides.

Vukovits (G.). **Die Blattbräune — eine häufige Krankheit an Quitten- und Birnenunterlagen.** [Leaf browning—a common disease on Quince and Pear stocks.]—*Pflanzenarzt*, **11**, 8, pp. 88–89, 3 fig., 1958.

A brief, popular note on *Stigmatea mespili* infection of ungrafted pear and quince stocks in Austria [cf. **15**, p. 103; **30**, p. 374].

Serious fruit disease.—*Gdnrs' Chron.* (*& Gdng ill.*), **144**, 18, p. 262, 1958.

The 1st record in England of fireblight (*Erwinia amylovora*) [**38**, p. 60] is reported from a few pear orchards in Kent, where it has caused serious damage since 1957, killing or damaging mature trees, the vars. mostly affected being Laxton's Superb and Conference.

Fridlund (P. R.). **Two promising cold-tolerant index hosts for the Prune dwarf and line pattern viruses.**—*Plant Dis. Reptr*, **42**, 9, pp. 1051–1053, 3 fig., 1958.

In bud inoculation tests at the Irrigation Experiment Station, Prosser, Washington, symptoms of prune dwarf virus on Krikon prune plum (*Prunus insititia*) and of [plum] line pattern virus on Ember plum (Shiro × S. Dakota 33) were more severe than those on the commonly accepted index hosts, Italian Prune and Shiro plum, respectively [cf. **37**, p. 488]. Because of their extreme winter-hardiness. Krikon and Ember may be useful for indexing in areas where the other hosts cannot be grown.

Vitanov (M. M.). Нови възможности за борба с червените листни петна по Сливата. [New possibilities for the control of red leaf blotch of Plum trees.]—*Bull. Plant Prot., Sofia*, **6**, 1, pp. 37–41, 1957.

At the Drenovo Fruit Research Station, Bulgaria, it was found that one application of 1% selinon on 12 Apr. 1956 under an Ontario plum tree, heavily infected in the previous season, ensured the almost complete eradication of the leaf blotch fungus [*Polystigma rubrum*: **37**, p. 92] and prevented perithecial formation. It is recommended that a 1% solution should be used on the soil and 1·5% on the tree.

Eaks (L. L.), Eckert (J. W.), & Roistacher (C. N.). **Rhizopus rot on Peaches.**—*Calif. Agric.*, **12**, 7, pp. 7, 14, 1 graph, 1 fig., 1958.

A more detailed account of information already noticed [**37**, p. 726]. *Rhizopus nigricans* [*R. stolonifer*] rot in peaches scratch-inoculated with a spore suspension was effectively controlled by a 6-hr. fumigation with ammonia gas at 70–75° F. 2 hr. after inoculation; an av. conc. of 234–500 p.p.m. gave 100% control assessed 2 days after inoculation and 45% control at 4 days, compared with 100% and 88% respectively, with 500–740 p.p.m. The fruit was not injured.

Schweizer (H.). **Beiträge zur Biologie des Kirschen- und des Pfirsichschorferregers (Fusicladium cerasi (Rabh.) Sacc., Venturia cerasi Ad. und Cladosporium carpophilum v. Thüm.).** [Contributions to the biology of the Cherry and Peach scab pathogens (*F. cerasi*, *V. cerasi*, and *C. carpophilum*).]—*Phytopath. Z.*, **33**, 1, pp. 55–98, 22 fig., 3 graphs, 1958. [English summary.]

Investigations at the Institut für Phytopathologie, Aschersleben, Berlin, showed that contrary to data in the literature [**7**, p. 587] *V. cerasi* and *C.* [*Fusicladium*] *carpophilum* must be regarded as 2 separate spp. There was no indication of the occurrence of physiological races in either fungus. In the field *V. cerasi* was found only on sour cherry (particularly var. Schattenmorelle) and to a slight extent on sweet cherry, but in the laboratory apricot and Myrobalan were infected, the shoot epidermis being susceptible but not the leaves. *F. carpophilum* attacked peach in field and greenhouse tests, and in the laboratory also infected apricot and Myrobalan shoots but not leaves. On its main host, the Schattenmorelle, *V. cerasi* infected fruits more severely than leaves (usually only on the upper surface), and also young shoots. Young shoots of sweet cherry were infected only in the laboratory.

F. carpophilum infected only the fruits and shoots and not the leaves of peach. Strains of both fungi from different hosts or host organs showed no host or organ

specificity. The formation of perithecia of *V. cerasi* in dead leaves and scabbed shoots were important as means of overwintering and as sources of primary infection. Certain characteristics, which are described in detail, distinguished it from the shoot scab of *V. denditricum* [*V. inaequalis*] and *V. pirina*. It is probable that *F. carpophilum* can overwinter only on shoots. Only the ascospores and conidia of *V. cerasi* and the conidia of *F. carpophilum* were able to cause infection. The upper and lower leaf surfaces of Schattenmorelle differed in susceptibility. The inoculation time for *V. cerasi* was partly dependent on the intensity of infection and the temp.

Although ascospores and conidia of *V. cerasi* capable of infecting could be found before flowering in each year of observation (1954–57), the 1st leaf and fruit infections occurred only about 14 days after flowering. It was concluded that the lateness of the primary infections was caused by factors other than climatic conditions. It was possible to demonstrate juvenile and age resistance in the fruits of Schatten Morelle and particularly the former in the leaves. In drawing up a spore germination table for determining the dates of spraying, according to the system of Sproston and Mills, consideration must be given to the fact that Schattenmorelle fruits are more susceptible than the leaves.

Fink (H. C.). **Indexing Sour Cherry trees for necrotic ring spot on excised twigs.**—Abs. in *Phytopathology*, **48**, 8, p. 461, 1958.

Growth of excised dormant twigs is stimulated by 3 p.p.m. gibberellin solution. A bud known to be infected with [peach] necrotic ring spot is grafted between 2 axillary buds on the twig to be indexed. If symptoms develop as the buds unfold the tree is free from ring spot; absence of symptoms indicates infection. Alternatively, a bud to be indexed is grafted to a twig known to be uninfected. Appearance of symptoms on the unfolding 'known' buds indicates that the 'unknown' was infected. To index large trees bud sticks from 2 or more parts of the tree, depending on its size, should be used.

Schmidle (A.). **Ein Zweigsterben der Johannisbeere verursacht durch Botrytis cinerea Pers. ex Fr.** [Shoot die-back in Currants caused by *B. cinerea*.]—*Phytopath. Z.*, **33**, 2, pp. 117–126, 3 fig., 2 graphs, 1958. [English summary.]

The fungi isolated during 1955–57 at the Institut für Obstkrankheiten, Heidelberg, Germany, from dying red currant twigs consisted of 62% *B. cinerea* [**27**, p. 188] and 20% *Nectria cinnabarina* [**32**, p. 32]; the remainder was made up of several fungi, some not yet identified. The twigs were particularly susceptible to inoculation with *B. cinerea* from Oct. to April, and most resistant from the beginning of fruit maturity until about the middle of Aug.

Bjørnstad (A.). **Virussjukdommer på Bringebær.** [Virus diseases of Raspberries.] —Reprinted from *Hagetidend*, *1958*, 5–6, 3 pp., 10 fig., 1958.

This is a popular note on the occurrence and control of vein chlorosis, veinbanding, yellow mosaic, mosaic 2 or leaf mottle complex [including black raspberry necrosis], leaf curl, and curly dwarf virus diseases in Norway. Vein chlorosis affects all commonly cultivated vars., e.g., Asker, Lloyd George, Malling Promise, Malling Landmark, and Preussen, as well as wild raspberries. Lloyd George and Preussen are the most susceptible to veinbanding, which has not been observed on Asker and Marlborough. Severe yellows is most prevalent on Marlborough, Preussen, and wild raspberries. Lloyd George carries most of the viruses in the mosaic 2 complex in a latent form, while one latent is present in Malling Landmark and another causes typical leaf mottling.

Aphis idaei is responsible for the spread of vein chlorosis and *Amphorophora rubi* for that of veinbanding and several of the mottle complex, while curly dwarf

is transmitted by *Macropsis fuscula*. Rigorous and repeated inspection and testing are fundamental for control.

Becker (R. F.), Goodman (R. N.), & Goldberg (H. S.). **Post-harvest treatment to control Strawberry fruit rot.**—*Plant Dis. Reptr*, **42**, 9, pp. 1066–1068, 1 fig., 1958.

At the University of Missouri, Columbia, ripe Dixieland and Blakemore strawberries, sprayed with a suspension of *Botrytis cinerea* the day after picking and incubated for 4 hr., were immersed for 1 min. in 100 p.p.m. solutions of several antibiotics, 1,000 p.p.m. captan, or water, dried, sprayed with *Rhizopus stolonifer*, dried again, and stored at 21° C. After 72 hr. dry control fruits (not dipped before infection and storage) showed the least decay; cycloheximide [actidione] and oligomycin were more effective than the other fungicides (including nystatin [mycostatin: cf. **37**, p. 97]) and far superior to dipping in water. Re-isolations were predominantly of *R. stolonifer*.

Miller (P. W.). **Comparative efficiency of excised leaf-petiole grafts and stolon grafts for transmitting certain Strawberry viruses.**—*Plant Dis. Reptr*, **42**, 9, pp. 1043–1047, 2 fig., 1958.

In investigations by the U.S. Dept Agric. and Oregon Agricultural Experiment Station a modification of a leaf grafting technique [**36**, p. 255] by which the prepared scion was inserted in a slit made in the stock petiole just below the lateral leaflets, without removing the terminal one, was as efficient as stolon grafting (approach method) [**31**, p. 441] in transmitting the strawberry mottle, veinbanding, latent [**38**, p. 21], and mild crinkle [mottle+vein chlorosis, or vein chlorosis alone] virus components to *Fragaria vesca*×*F.v.* var. *alpina* indicator plants [cf. **37**, p. 491]. Symptoms usually appeared 5–10 days earlier and were more severe.

Dobie (N. D.), Vaughan (E. K.), Miller (P. W.), & Waldo (G. F.). **New facilities and procedures used for growing disease-free Strawberry plants in Oregon.**—*Plant Dis. Reptr*, **42**, 9, pp. 1048–1050, 2 fig., 1958.

New procedures adopted at the Strawberry Plant Propagation Center [**36**, p. 254] include the leaf-petiole graft technique for virus indexing [see above] and a petiole plating method for the detection of *Verticillium* [*albo-atrum*: **38**, p. 19] infection, which is increasing throughout Oregon.

Posnette (A. F.) & Cropley (R.). **Heat treatment for the inactivation of Strawberry viruses.**—*J. hort. Sci.*, **33**, 4, pp. 282–288, 1 pl., 1958.

Further experiments at the East Malling Research Station [**34**, p. 770; **35**, p. 875] indicated that in the 20 vars. used treatment for up to 50 days at 37° C. inactivated mottle virus (6 days for one Perle de Prague plant), though the time needed for permanent virus inactivation varied considerably. Elimination of crinkle virus, though effected in 9 days in Huxley's Giant, required 30–50 days in other vars. Yellow edge appears more difficult to eradicate, some plants apparently cured after 26 days relapsing more than a year later. Vein chlorosis virus is also as hard to eliminate as crinkle.

It is suggested that the resurgence of a virus not killed by heat treatment, in plants which remained symptomless and without transmissible virus much longer than the normal incubation period, was due to partial cross protection by avirulent strains less affected by the treatment.

Edmonstone-Sammons (Chloris). **Some aspects of black spot in Pineapple.**—*S. Afr. J. agric. Sci.*, **1**, 2, pp. 111–120, 3 graphs, 1958. [Afrikaans and French summaries.]

This paper contains further details of results already noticed [**36**, p. 536].

Chevaugeon (J.) & Merny (G.). **Maladies des arbres à quinquina en Guinée française.** [Diseases of *Cinchona* trees in French Guinea.]—*J. Agric. trop. Bot. appl.*, **3**, 11, pp. 605–626, 24 fig., 2 diag., 1956. [24 ref. Received Aug. 1958.]

An account is given of the parasitic fungi detected in diseased *Cinchona* trees at Sérédou, Macenta, French Guinea. The only fungus found attacking the roots and causing appreciable damage was *Armillariella* [*Armillaria*] *mellea* [cf. **34**, p. 675], prevalent in the forest areas of Upper Guinea, especially on coffee. Occasionally lethal to very young trees in low-lying, heavy soil, its presence was seldom noted until 4–5 yr. after planting; infected trees do not usually die until they are 7 yr. old.

The only disease observed in the seed-bed was one starting in the collar, especially if the stem was in contact with the soil, as a reddish-brown, necrotic spot. The lesion spread upwards sometimes girdling the seedling. Mortality, however, is low and the condition usually remains unnoticed. In the nursery the collar symptoms become more marked. The necrosis enlarges into a complete girdle which kills the cortical tissues and may reach a height of 7 cm. Before the tree dies the base of the trunk may double its diam. above the ring. The fungus isolated, a sterile mycelium, resembled a basidiomycete and was obtained also from the collar of fully grown trees in 7-yr.-old plantings.

An internal rotting of the collar occurs in the nursery when the young trees are about to be planted out. The bark is brown and dry and the wood has a reddish-brown marbling later. A *Phytophthora* sp. was isolated; it is usually followed by various secondary fungi.

Collar and trunk diseases in the plantation are probably a continuation of nursery *Phytophthora* attack; they include a condition resembling stripe canker [cf. **30**, p. 628], associated with secondary infection by *P. sp.* and chiefly affecting trees growing on a very steep S. slope, and a disease similar to the girdle canker found in Guatemala [loc. cit.], which chiefly attacks grafted trees; *P. parasitica* was isolated from pieces of affected collar.

Diseases of the branches and tops include a wilt in which apparently healthy tissues below the last visibly affected node always yielded only *P. parasitica*, which was succeeded by various fungi. Pink disease (*Corticium salmonicolor*) [cf. **25**, p. 45] was found in 1952 in an old planting and has spread steadily since; it now rapidly kills trees under 5 yr. old and may mask the symptoms produced by the other parasites.

Plots given dressings of K developed significantly less disease than those given N; similarly, K and P together gave better results than N or P alone or NPK together.

Thomas (C. A.). **Reaction of Safflower varieties to regional collections of Puccinia carthami.**—*Plant Dis. Reptr*, **42**, 9, pp. 1089–1090, 1958.

The reactions (tabulated) of safflower vars. and selections inoculated in the greenhouse at Beltsville, Maryland, with several uredospore collections of *P. carthami* and with races previously described [**35**, p. 488] indicated the occurrence of races 2 and 3 both in California and Arizona, 3 in Utah, and 4 in Nebraska. Indications have also been found of 4 in California and 3 in Nebraska. Exchange of infested seed will probably soon spread these races to all safflower-producing areas.

Malaguti (G.) & Díaz (C. H.). **Aparición de una nueva enfermedad del Ajonjoli : 'tallo negro'.** [Appearance of a new disease of Sesame: 'black stalk'.]—*Agron. trop., Maracay*, **7**, 3, pp. 159–160, 2 fig., 1957.

A disease of *Sesamum indicum* observed since Dec. 1957 in the Estado Portuguesa, Venezuela, appears as a blackening of the stalks at or just above soil level and induces premature desiccation and scanty fruit production. *Phoma* sp. was isolated.

Matsushima (T.) & Asahina (H.). **Oospora sp. isolated from mouldy opium.**—*J. Jap. Bot.*, **33**, 2, pp. 56–59, 6 fig., 1958.

A single *O.* sp. was found to be the main cause of moulding of imported opium [cf. **37**, p. 177].

Keller (E. R.). **Bericht über die Hauptversuche mit neuen Kartoffelsorten 1954–1956.** [Report on the principal tests of new Potato varieties 1954–56.]—*Mitt. schweiz. Landw.*, **5**, 6, pp. 97–107, 1957.

Following routine field tests at 7 centres during 1954–56 in comparison with the standard var. Bintje, none of the 4 vars. tested was incorporated into the official Swiss standard assortment. All are immune from wart [*Synchytrium endobioticum*: **37**, p. 550]. Bella is an early to medium-early var., possessing good resistance to blight [*Phytophthora infestans*: loc. cit.], remarkable resistance to potato leaf roll and mosaic [X] viruses, and hypersensitivity to virus A. Internal rust occurs, but this var. suffers little from other tuber diseases. Forelle, early to medium-early, is only slightly susceptible to late blight on the haulm but somewhat more so to tuber rot, and is liable to heavy virus attack. Ker Pondy, medium-late, has medium susceptibility to haulm blight and tuber rot, and good tolerance of virus diseases. Internal rust and other internal tuber disorders are sporadic. Ulster Supreme, medium-early to medium-late, is rather susceptible to both haulm blight and tuber rot, and very susceptible to virus diseases, especially leaf roll.

Boser (H.). **Einfluß pflanzlicher Virosen auf Stoffwechselfunktionen des Wirtes. II. Mitteilung. Aktivitäten einiger Fermente des Glycolysesystems und des Citronensäurecyclus in gesunden und virosen Kartoffelblättern und -knollen.** [The influence of plant viruses on the metabolic processes of the host. Part II. Activities of some enzymes of the glycolysis system and the citric acid cycle in healthy and virus-infected Potato leaves and tubers.]—*Phytopath. Z.*, **33**, 2, pp. 197–202, 2 graphs, 1958. [English summary.]

In further studies [cf. **36**, p. 611] at the Institut für Biochemie, Hann.-Münden, Germany, the activity of malic acid dehydrogenase was not influenced by the viruses of leaf roll, streak [potato virus Y], and mosaic in Ackersegen, Adelheid, and Vertifolia potato tubers and leaves. The reduction of phosphoglucomutase activity in the tubers by leaf roll was confirmed in a 2nd var. Enolase activity was similar in the tubers but in the leaves it tended to be increased by leaf roll and mosaic. These viruses also increased hexokinase activity in tubers. Glycolytic enzyme activity was not altered by potato virus Y; the absolute value of the change in activity with leaf roll and mosaic was different in Vertifolia and Ackersegen, but the direction was the same. Enzyme activity was almost confined to the supernatant after ultracentrifuging (1 hr. at 46,000 g.) the homogenate.

Chesnokov (P. G.). Вирусное вырождение Картофеля в северо-западной зоне СССР. [Virus degeneration of Potatoes in the north-west zone of U.S.S.R.]—*Bull. appl. Bot. Pl.-Breed.*, **30**, 3, pp. 125–139, 1957. [Abs. in *Referat. Zh. Biol., 1958*, 11, p. 198, 1958.]

Inoculation of healthy plants and dissemination of natural infection by interplanting healthy and infected plants in tests in the Leningrad region, U.S.S.R., over 4 yr. indicated that Berlinhingen, Apron, and Imandra were highly susceptible, Lorkh, Vol'tman, and Majestic of medium resistance, and Smislovskii and Shterkeragis resistant to virus infection.

Richardson (L. T.) & Racicot (H. N.). **Observations of tuber transmission of Aster yellows (purple-top) of Potatoes.**—*Plant Dis. Reptr*, **42**, 9, pp. 1039–1042, 4 fig., 1958.

During a tuber indexing experiment at Ottawa, Ontario [**31**, p. 509], primary

symptoms of aster yellows virus were found on 5 successive generations of Green Mountain plants, but 2nd-year symptoms (stunted growth with stiff, erect, rolled, chlorotic leaves) indicating tuber transmission appeared only on a few plants in the final season. Both healthy and infected plants were sometimes obtained from the same tuber. From plants with 2nd-year symptoms the virus was invariably transmitted to the next generation through aerial tubers, but never through those formed underground [cf. **37**, p. 552].

Losses caused by Potato blight in England and Wales. —*Plant Path.*, **7**, 2, pp. 39–48, 1 graph, 3 maps, 1958.

This contribution from the Conference of Plant Pathologists, National Agricultural Advisory Service, compiled by E. C. Large, deals with the losses in unsprayed potato crops due to premature defoliation by *Phytophthora infestans* [**32**, p. 584], the reduction of defoliation losses by protective spraying [**34**, pp. 172, 476], losses due to blight in the tubers, and the inter-relations of seasonal differences in yield, blight losses, and gains from spraying [**37**, pp. 105, 302].

Systematic recordings since 1952 of blight in the tubers of some 2,000 potato crops a year show that the damage varies very greatly from crop to crop. Even in a bad year more than ½ the crops suffer little or no loss, but there is always a small proportion with a heavy loss. For example, in 1954, a 'blight' year, 57% of the 2,109 crops had virtually no blighted tubers when lifted and ¼ had 1–5 cwt./acre loss, but over 100 had over 1 ton loss and 2 had over 3 tons. In the 3 'blight' years 1953, 1954, and 1956 the mean loss for the whole country was 1½–1¾% (3½ cwt./acre); loss in Arran Banner and Gladstone was ×6 that in Majestic, and in King Edward ×2. About 1% loss occurs in store.

A table summarizes the potential yields and postulated losses based on a 10-yr. period. The point is brought out that in a 'blight' year the increased rainfall would give a higher potential yield. When this is considered, the losses from blight do not bring the average down below that of normal yields in dry years.

Fiedler (R.). **Ist in Niederbayern ein Phytophthora-Warndienst möglich?** [Is a *Phytophthora* warning service possible in Lower Bavaria?]—*Pflanzenschutz*, **10**, 7, pp. 94–96, 1958.

A survey in 1957 at the Bayer Landesanstalt für Pflanzenbau und Pflanzenschutz indicated that Beaumont's method [cf. **37**, p. 553] gave a useful indication of the date of 1st attacks of *P. infestans*, but for a practical warning service it would need to be supplemented by observations on suitably located unsprayed plots of potatoes planted for the purpose. Thus, the 1st warnings for early vars. and for especially susceptible mid-early vars. such as Bona and Grata would be given when critical weather occurred at a stage when plants of the local susceptible early var. Oberarnbacher (recommended for such plots) had developed sufficiently to meet in adjacent rows. The 'main' warning, applying also to the late vars., would be given when the 1st attack occurred on these plots.

Zogg (H.). **Die Bekämpfung der Kartoffel-Krautfäule.** [The control of Potato haulm blight.]—*Mitt. schweiz. Landw.*, **5**, 6, pp. 108–114, 3 fig., 1957.

These recommendations to Swiss potato growers for the control of blight [*Phytophthora infestans*] have been noticed [**37**, p. 5].

Dorozhkin (N. A.) & Ramnëva (Mme Z. I.). Авіяапырскванне ў барацьбе з фітофторай Бульбы. [Spraying with planes for the control of phytophthorosis of Potatoes.]—Сел. Гаспад. Белорусі [*Sel. Gaspad. Belorussia*], *1957*, 5, p. 17, 1957. [Abs. in *Referat. Zh. Biol.*, *1958*, 11, pp. 198–9, 1958.]

For the control of blight [*Phytophthora infestans*: **37**, pp. 304, 596] on potatoes spraying

with 0·1–0·2% $CuSO_4$ every 8–10 days after the appearance of the shoots decreased the damage on the tubers 3–4 times and increased yield up to 40–63 c./ha. For aerial spraying 0·1% $CuSO_4$ at 100–200 l./ha (or 0·2% at 50–100 l.) when the shoots appear, and 3% Bordeaux at 200 l. (or 1–2% at 300 l.) when flowering begins are recommended.

Guimarães (F. F.), Luz (N. K.), & Liberal (M. T.). **Trabalhos de melhoramento em Batata americana (Solanum tuberosum L.), visando obtenação de resistência ao fungo Phytophthora infestans (Mont.) de Bary.** [Improvement of the American Potato (*S. tuberosum*) with a view to obtaining resistance to the fungus *P. infestans*.]—*Agron. Sulriograud.*, **3**, pp. 35–38, 1958. [English summary.]

Potato vars. released from the Estação Experimental de Horticultura, Rio Grande do Sul, Brazil, include Petrolini 112, immune from race 0 of *P. infestans* [**34**, p. 314] and Gaúcha, with a high degree of tolerance. Pantucha (Panther × Gaúcha) and X-368–18 (466 × Loman), both immune from race 0, were to be available in 1958. Races 1 and 3 of the fungus have also been found in Brazil.

Wenzl (H.). **Dörrfleckenkrankheit und Krautfäule der Kartoffel. Welche Fungizide verwenden wir im Kartoffelbau?** [Target spot and haulm blight of Potato. What fungicides do we use in Potato cultivation?]—*Pflanzenarzt*, **11**, 5, pp. 58–60, 5 fig., 1958.

A popular note on the distinction between symptoms of *Alternaria solani* and *Phytophthora infestans*. Against *A. solani* dithane Z-78 is superior to Cu preparations and is therefore to be preferred in the drier areas of eastern Austria where late blight is comparatively rare.

Chambers (S. C.). **Pink rot of Potatoes.**—*J. Agric. W. Australia*, **7**, 4, pp. 405–406, 1 fig., 1958.

Pink rot (*Phytophthora erythroseptica*) [cf. **34**, p. 706; map 83], 1st recorded in Western Australia at Harvey in 1946, caused losses also in the Dardanup and Benger districts in 1958. For its control a 4-year-rotation on contaminated land, use of clean seed, and drainage improvements are recommended.

Kranz (J.). **Untersuchungen über die Phoma-Fäule der Kartoffelknolle unter besonderer Berücksichtigung des Wirt-Parasit-Verhältnisses.** [Studies on *Phoma*-rot of Potato tubers with particular reference to the host-parasite relationship.]—*Phytopath. Z.*, **33**, 2, pp. 153–196, 13 fig., 8 graphs, 1958. [55 ref. English summary.]

The symptoms of potato gangrene (*P. foveata*) [**36**, p. 207] and its stages of development are described in detail from the Institut für Pflanzenkrankheiten, University of Bonn. The fungus is an obligate wound parasite with a long incubation period. The occurrence of gangrene from Oct. onwards and its increase during winter storage are conditioned by diminishing resistance in the tuber. Temps. near 0° C., 80% R.H., storage in the dark, plenty of oxygen, and high spore conc. favour infection. The influence of pre-infectional, simultaneous, and post-infectional wound-cork reactions on resistance to and interactions with *P. foveata* as affected by the temp. are described in detail. The effect of the temp. on the pathogenicity of the parasite is also investigated. The growth of the fungus is inhibited by biochemical changes in the infected tissues, the nature of which still requires explanation. They are accompanied by an increase in pH, which in itself can depress the growth of the fungus. Experiments with potato sap suggest an induced chemical reaction specific to potato sap and independent of the living cell.

Herzog (W.) & Wartenberg (H.). **Untersuchungen über die Lebensdauer der Sklerotien von Rhizoctonia solani (Kühn) im Boden.** [Studies on the duration of life of sclerotia of *R. solani* in the soil.]—*Phytopath. Z.*, **33**, 3, pp. 291–315, 1958. [English summary.]

Experiments at the Institut für allgemeine Botanik, Friedrich Schiller University, Germany, showed that *R.* [*Corticium*] *solani* [cf. **37**, p. 736] can grow saprophytically and form sclerotia in the soil. In this it is favoured by some unknown factors in the rhizosphere of higher plants. Decaying plant parts, such as potato haulms and tubers, have an inhibiting effect on the fungus, since they provide an excellent substrate for fungistatic antibionts [cf. **36**, p. 546] which also prevent the germination of the sclerotia and thus preserve them. If the antibionts on the sclerotia are destroyed, germination will still occur even after 5 years. The action of the rhizosphere seems to favour *C. solani* or to protect it against the antibionts.

Kantack (E. J.) & Martin (W. J.). **Effect of internal cork on yield and grade of Sweet Potato roots.**—*Phytopathology*, **48**, 9, pp. 521–522, 1958.

Yield data from field trials in Louisiana 1955–57 show that sweet potato internal cork virus [**37**, p. 677] did not appreciably reduce the yield of Unit 1 Porto Rico sweet potatoes, though severely affecting quality.

Jermoljev (E.) & Průša (V.). К вопросу исследования сущности нитевидного прорастания Картофеля. [On the question of research into the nature of hair sprouting of Potatoes.]—За соц. сел.-хоз. Науку [*Social. agric. Sci., Prague*], Ser. A, **7**, 3, pp. 233–260, 2 fig., 1958. [English and German summaries. 50 ref.]

At the Research Institute for Crop Production, Czechoslovak Academy of Agriculture, Prague, microbiological analyses showed a considerably larger amount of growth stimulators in hair sprouting potatoes than in normal ones, which undoubtedly reflects the pathological disharmony of the metabolism. There was considerably less α-alanine and threonine in the hair sprouting ones. No specific antigenic properties were found in the hair sprouts [**38**, p. 74].

The incidence of hair sprouting tubers among seed potatoes can be restricted by growing them only in higher regions, and eliminated in these and unsuitable areas, as for example in S. Moravia, S. Slovakia, and along the R. Elbe, by roguing the hair-sprouted tubers, especially in early vars., and following up with an early harvest.

Riggenbach (A.). **A note on the chemical control of the white root disease of Rubber.**—*Quart. Circ. Rubb. Res. Inst. Ceylon*, **34**, 1–2, pp. 8–10, 2 pl., 1958.

Tillex [**35**, p. 127] was the most effective of several fungicides (including copper sulphate) tested in the laboratory against *Fomes lignosus* [see below] and was non-phytotoxic to budded stumps and young rubber seedlings. From the results of field experiments it is suggested that the roots of young plants be dipped in a 5% solution and allowed to dry before planting; later the soil round the plants may be watered with a 1% solution (½–1 gal./plant), this being repeated 2 or 3 times at intervals of 2–3 months. Curatively, after exposing the roots and removing infected parts the roots are painted with a 1% solution and allowed to dry. The earth is replaced and saturated with the same solution (about 2½–3 gal. for trees up to 2 yr.). Tillex is poisonous to man.

Riggenbach (A.). **Report of the Plant Pathology Department.**—*Rep. Rubb. Res. Inst. Ceylon, 1957*, pp. 49–57, 1958.

It is stated [cf. **37**, p. 180] that against *Oidium hevae* [cf. **37**, p. 594] karathane dust (1%) at 24 lb./acre/application once a week took an intermediate place between

sulphur dust at 12 lb./acre/application (once) and the same twice a week (the best control). In blocks dusted weekly with 6 lb. S leaf fall was more than twice as high as in those receiving 12 lb.

Against leaf disease due to *Phytophthora palmivora* [cf. **35**, p. 324 and below] the most effective fungicides were Cu-based materials. No difference could be found between copper oxide and copper oxychloride preparations, or between dusts (without stickers) containing 4 and 6% Cu. Ciba 1% Cu with a special sticker incorporated was as effective as the 4% dust. The best results were secured with 300-mesh (B.S.I.) dusts; filler and Cu compounds should be sieved together. Applications of 8–10 lb./acre/application every 5 days appeared the most satisfactory.

Black stripe disease and bark canker (*P. palmivora*) [cf. **36**, p. 58] have become progressively more important in certain localities, causing considerable damage. In laboratory and field tests of some water-miscible fungicides on tapping panels and canker patches antimucin was by far the most effective.

Against root disease (*Fomes lignosus*) tillex liquid [see above] had an excellent curative effect, 90–95% of the treated trees being saved.

Riggenbach (A.). **A new waterproof fungicide.**—*Quart. Circ. Rubb. Res. Inst. Ceylon*, **34**, 1–2, p. 12, 1 pl., 1958.

In the treatment of bark canker of rubber trees (*Phytophthora palmivora*) kankerdood [**30**, p. 112] was found to possess the advantages of a water-miscible fungicide and a waterproof dressing. It is of a paint-like consistency and is best applied to wounds with a good paint brush after removal of infected parts. Growing tissue can respire to some extent under the protective covering and treated wounds heal well. It is poisonous to man.

Risdon (E. J.). **Further comments on the contamination of natural Rubber by fungicidal dusts containing copper. Part I.**—*Quart. Circ. Rubb. Res. Inst. Ceylon*, **34**, 1–2, pp. 13–29, 1958.

The data collected on this subject in 1957 and earlier [cf. **37**, p. 308] are reviewed at length. The possibility of a controlled blending of scrap crêpes supplemented by an elaborate system of analysis is discussed in detail. Information on the relative extent of contamination from small-scale dusting experiments suggests that an approved 1% Cu dust with a sticker may be the most suitable. A list of precautions for 1958 is included.

Tabayoyong (F. T.). **Cane diseases and pests and their control.**—*Sug. News*, **34**, 7, pp. 343–349, 2 graphs, 1958.

On account of leaf scorch (*Stagonospora sacchari*), the H 37–1933 sugar-cane var. is stated to be producing 25% less sugar than formerly in the Victorias Milling District of the Philippines, where it occupies some 40% of the total area under the crop [**37**, p. 595], corresponding to an unrealized yield/ha. of more than 320,000 piculs [1 picul = 133½ lb.], equivalent to a money value of over 4,000,000 pesos [1 P = 3*s.* 7*d.* (1957)]. So severe is the degree of infection that only 3 open green leaves are commonly seen instead of the normal 10. Other vars. are listed according to the degree of susceptibility or resistance, the resistant being M 336, Q 49, POJ 2967, F 134, F 29–B491, B 37–161, Co. 655, Co. 617, and CP 43–47. Among the more promising of the chemicals tested against the fungus are aretan, granosan, fermate, manzate, zerlate, and dithane Z-78, but further studies on the economic feasibility of chemotherapy are required.

Other diseases of local importance are yellow spot [*Cercospora koepkei*: **35**, p. 634], ring spot [*Leptosphaeria sacchari*], red rot of the midrib [*Glomerella tucumanensis*], and red spot of leaf sheath [*C. vaginae*]. From a table showing the monthly

infestation trend of the 5 principal diseases in 1956 it appears that *S. sacchari* reached a climax of 38·56% in May and fell to a min. of 11·88 in Sept., the corresponding figures for *C. koepkei* being 39·92 in March and 29·83 in Jan., for *G. tucumanensis* 8·45 in Jan. and 3·71 in Feb., for *C. vaginae* 9·99 in Sept. and 5·36 in June, and for *L. sacchari* 10·27 in June and 4·99 in Dec.

Sugar losses due to ratoon stunting virus [**37**, p. 595] are 13–46 piculs/ha. in the plant and 28–80 in the ratoons. Q 50, Q 44, and Badila are resistant or tolerant, while 10 other vars. besides NCo. 310 are susceptible. Before the release to planters of new, promising vars., the setts are immersed for 2 hr. in water at 50° C. Other precautionary measures are briefly indicated.

A close watch is being kept on the development of Fiji virus disease, smut [*Ustilago scitaminea*], and downy mildew [*Sclerospora sacchari*: loc. cit.], to all of which the high-yielding H 44–3098 is very susceptible.

Yellow spot disease of Sugarcane.—*News Lett. Indian Inst. Sug. Cane Res.*, **4**, 1–6, pp. 1–2, 1958.

Yellow spot (*Cercospora koepkei*) [map 341] has been prevalent in the States of S. Bombay, Mysore, Andhra, Madras, and Orissa since 1954. It appears between Aug. and Mar. The vars. Co. 419 and Co. 527 are highly susceptible, Co. 421 moderately so, and Co. 449 is very resistant. Incidence in Co. 419 was 6–8% in one area, up to 80–100% in others; in Co. 527 it was 20–80% and in Co. 421 15–20%.

Visser (T.), Shanmuganathan (N.), & Sabanayagam (J. V.). **Blister blight control in 1957 with respect to fungicidal formulation, application rates and yield. A note on the effect of different copper preparations on Tea yield.**—*Tea Quart.*, **29**, 1, pp. 9–20, 45–46, 1958.

On the St. Coombs Estate, Ceylon, during the 1957 S.W. monsoon 12 fungicides were tested against blister blight [*Exobasidium vexans*: **37**, p. 738] in 4 tea fields. Assessment of disease incidence showed that there was little to choose between 50% perenox or 50% copper Sandoz, 70% red copper, 35% cupravit blue, and 50% Shell copper, all at 6 or 8 oz./acre. Addition of a special sticker to Shell copper conferred no advantage. These fungicides at 3 or 4 oz./acre also gave a reasonable protection to fields in plucking in moderately severe monsoon conditions. Yield variations were insignificant for the different fungicides and rates of application, but the unsprayed averaged 16% loss.

In the 2nd paper are reported the results of a spraying test with 7 Cu fungicides in Feb.–Apr. 1958 which showed that normal rates of application have no phytotoxic effect.

Sarmah (K. C.). **Plant Pathology Branch—Mycological section.**—*Rep. Tocklai exp. Sta., 1957*, pp. 132–152, 1958.

This report [cf. **37**, p. 374] mentions that 27 hosts of *Botrytis*, the cause of the tea flower disease, are recorded at Tocklai, indicating its plurivorous nature. Two types of apothecia, a short and a long stipitate form, are common in the field. Sclerotia of *Botrytis* could not be induced to form apothecia *in vitro*, suggesting that apothecia found under tea seed trees are not connected with the *Botrytis* found on tea flowers. *Botrytis* is not present on the sepals or in the ovaries, even though the styles show the fungus. Percentage occurrences of the fungus increased in petals, stamens, and styles 48 hr. after anthesis. The symptomatology and etiology of this disease is covered in further detail in an appendix by V. Agnihothrudu (pp. 153–167, 6 graphs).

Agnihothrudu (V.). **A new species of Discosiella from Assam.**—*J. Indian bot. Soc.*, **37**, 1, pp. 42–46, 6 fig., 1958.

A fungus found on dead tea twigs at the Tocklai Experimental Station, Assam, in

Nov. 1956 differed from the 3 described *D.* spp. in the size of the pycnidium (200–450 μ diam.), shape of spores (subcylindrical with obtuse ends, slightly narrower at the base, often allantoid or botuliform, rarely straight), which measured 16–21 × 3–6·4 μ, and the subterminal attachment of the cilia and their length (av. 18·8 μ). *D. longiciliata* Agnihothrudu is proposed.

Berger (P.). **Die Symptomausprägung einiger Virosen auf Tabak unter Freiland- und Gewächshausbedingungen.** [The symptom expression of some viroses of Tobacco under outdoor and greenhouse conditions.]—*Ber. Inst. Tabakforsch. Dresden*, **5**, 1, pp. 111–126, 1958. [Russian and English summaries.]

Disparities in the expression of tobacco viroses, notably the vein-browning strain of potato virus Y (the economic importance of which is stated to be steadily increasing in the Dresden area of Germany [**37**, p. 421]), mosaic [**37**, p. 419], and 'tabakmauche' [**37**, p. 433], are described, tabulated, and discussed in the light of field and greenhouse experiments. The differences observed are believed to arise not only from environmental factors and varietal characteristics, but also from the passage through previous hosts.

McDonald (I.), Cole (J. S.), & Legge (J. B.). **Notes on seedbed management.**—*Rhod. Tobacco, 1958*, 17, pp. 21–22, 1958.

Among these recommendations to Rhodesia and Nyasaland tobacco growers it is noted that methyl bromide at 1 lb./100 sq. ft. proved slightly better than zineb as soil treatment against anthracnose [*Colletotrichum tabacum*: **36**, p. 380]. Zineb applied to the soil has sometimes caused poor and uneven growth. To reduce the chance of infection coming in from untreated soil a drench of at least 1 oz. thiram or 8 oz. zineb/3 gal. water/30 sq. yd. to the ground within 5–6 ft. of the seedbeds is suggested. Spraying the beds with thiram, zineb, or maneb should start 3–4 weeks after seeding and continue until the seedlings are ploughed in.

Elenkov (E.). Болести по късните Домати. [Diseases on late Tomatoes.]—Овощарство и Градинарство [*Ovoshtarst. & Gradinarst.*], *1958*, 8, pp. 44–48, 6 graphs, 1958.

Blight (*Phytophthora infestans*) was very severe in 1957 in S. Bulgaria, where it was 1st recorded on tomatoes in 1955. Yields were reduced to 12·5% of the normal. The summer was exceptionally wet. Fruit rot (*Alternaria solani*), recorded for the 1st time in 1957 [but cf. Atanasov *et al.*, **10**, p. 210], caused disastrous damage to late tomatoes. Fuclasin-ultra at 0·15% was the most effective of various chemicals tried, but control was poor. Cucumber mosaic virus was also very widespread, and in Plovdiv province damaged 64% of the late tomatoes. Tomato big bud virus is on the decline, but still widespread in the Plovdiv region. Recommendations for disease control are given.

McDonnell (K.). **Absence of pectolytic enzymes in a pathogenic strain of Fusarium oxysporum f. lycopersici.**—*Nature, Lond.*, **182**, 4641, pp. 1025–1026, 1958.

Mutants of strain R–5–6 of *F. oxysporum* f. [*F. bulbigenum* var.] *lycopersici* from Wisconsin [**37**, p. 739], obtained by ultra-violet irradiation of microconidia at the Botany School, Cambridge, were examined under standard conditions for pathogenicity and ability to produce pectic enzymes. Strain 80, which formed no pectolytic enzyme but produced pectin methyl esterase, was moderately pathogenic (leaf yellowing and shrivelling, vascular browning and plugging) to the susceptible tomato var. Kondine Red whether inoculated into the roots or introduced into cuttings by the transpirational method; it did not cause the severe symptoms (severe wilting, collapse of the leaves, and death of the plants) typical of the wild type R–5–6.

Sivadjian (J.) & Kern (H.). **Über den Einfluß von Welketoxinen auf die Transpiration von Tomatoblättern.** [On the influence of wilt toxins on the transpiration of Tomato leaves.]—*Phytopath. Z.*, **33**, 3, pp. 241–247, 5 fig., 1958. [English summary.]

At the Institut Pasteur, Paris, and the Eidgenössischen Technischen Hochschule, Zürich, transpiration was detected by means of specially treated, water-sensitive photographic plates prepared by placing new plates in developer and thoroughly exposing them to light. They are fixed, washed in running water for ½ hr., dried, and placed for a few min. in 3% $HgCl_2$, when they become quite white. After 20 min. in water they are transferred to 0·5% KI which causes the colour to change to orange and then to light yellow. As soon as they are uniformly yellow they are washed and dried. Before use the plates are uniformly browned in the sun or artificial light, a leaf is placed on a plate or between 2 plates, with the side to be examined against the emulsion and exposed until the image appears clearly in yellow on the plate. The transpiration picture can then simply be transferred to photographic paper.

Various wilt toxins (lycomarasmin, fusaric acid, culture filtrate of *Leucostoma nivea*) applied to tomato shoots [**37**, p. 761] caused parts of the leaf to become necrotic; these necrotic spots were found to be the areas with the highest intensity of transpiration, thus confirming that an excessive water loss is an important feature of poisoned and heavily damaged cells. Considerable differences in the effect of the various toxins were observed.

Landeiro (R.). **A mancha ferruginosa do Tomateiro.** [Rust spot of Tomato.]—*Bol. fitossanit.*, **7**, 1–2, pp. 1–5, 4 fig., 1957.

Bordeaux mixture at 1% or 0·2% or dithane Z-78 are recommended for the control of *Stemphylium solani* [**36**, p. 811] on the tomato vars. Santa Cruz, Paulista, and Rei Humberto in the Estado do Espírito Santo, Brazil.

Bacterial canker of Tomatoes.—*Agric. Gaz. N.S.W.*, **69**, 7, pp. 354–356, 3 fig., 1958.

A note on the recently increased prevalence in New S. Wales of *Corynebacterium michiganense* and recommendations for its control [**26**, p. 136; **34**, p. 434].

Rich (S.). **Fertilizers influence the incidence of Tomato internal browning in the field.**—*Phytopathology*, **48**, 8, pp. 448–450, 1958.

At Connecticut [Agricultural Experiment Station, New Haven] in 1956 Sioux tomatoes in randomized blocks were inoculated, either in the peduncle of the 1st fruit cluster or into the stem, with Boyle's C–IB–Tob. strain of tobacco mosaic virus [**36**, p. 621]. Of 3,177 fruits examined when the 1st 2 clusters were fully ripe, only 35 showed internal browning (IB), and only 2 of these were from inoculated plots.

In 1957 on land with K and P barely sufficient for plant growth the experiment was repeated with various virus inoculation (V) and fertilizer (K, P) treatments. Natural spread of virus was not restricted. Fruit was harvested 4 times in Sept. as clusters ripened, 4,569 fruits from 252 plants; at no time was IB severe. All the inoculated plots had significantly more IB than non-inoculated, and this increased in successive pickings, but VK plots had significantly less than the others. There was no significant difference between the IB in VPK, VP, and V, or in P, K, and the untreated. Only 1 plant showed IB at all 4 pickings, some (68%) showed it at least once, 30% 2 or more times, and 6% 3 times.

The data are considered to support the suggestion [**37**, p. 378] that IB results from a sugar deficiency of the developing fruit arising from 1 or more causes, acting alone or in unison; K probably acts by its effect on the production or translocation of carbohydrates.

Mańka (K.). **Fitopatologia leśna.** [Forest phytopathology.]—229 pp., 88 fig., Poznań, National Scientific Press, 1956. Zł. 12.50.

The 1st part of this book, intended mainly for forestry students, deals with the history of forest pathology and contains a general survey of diseases of forest trees and their control. In the 2nd part the author discusses in detail particular diseases, which he divides into (1) those of the roots and (2) all diseases of the above-ground parts except (3) those causing decay or staining.

List of publications on fungus defects in forest products and decay in trees.—*Publ. For. Prod. Lab., Madison*, 508, 27 pp., 1958.

A partial list of publications, arranged chronologically and grouped under headings depicting different aspects of the problem.

Příhoda (A.). **Rakovina jedleho Kaštanu.** [Canker on edible Chestnut.]—*Lesn. Práce*, **36**, 12, pp. 556–558, 1957. [Abs. in *Referat. Zh. Biol., 1958*, 13, p. 206, 1958.]

An historical survey of canker (*Endothia parasitica*) [map 66] on chestnut and other hosts with a description of damage and control. The disease has not yet been recorded in Czechoslovakia but the pathogen is spreading in Slovenia (Yugoslavia) [**31**, p. 358] on the Czechoslovak border.

Németh (Mária). **Előzetes jelentés a Cotinus telepítésekben fellépett fertőző hervadásról.** [Preliminary report on wilt observed in plantations of Smoke trees (*Cotinus*).]—*Kertész. kutató Intéz. Évk.*, **2**, pp. 341–347, 5 fig., 1957. [German and Russian summaries. Received Oct. 1958.]

In 1953 at the Budatétény Agricultural Research Institute, Hungary, a widespread wilting of *C. coggygria* was shown to be caused by *Verticillium dahliae* [cf. **36**, p. 141]. The fungus attacks mainly mechanically damaged parts and the majority of the infected trees were those propagated by root grafting.

Rosinski (M. A.). **A technique for more rapid production of perithecia in Ceratocystis ulmi.**—*Plant Dis. Reptr*, **42**, 9, p. 1091, 1958.

At the University of Maine, Orono, the time required for producing perithecia of *C. ulmi* by the method of Shafer and Liming [**30**, p. 294] was reduced to less than 3 weeks by substituting distilled water for tap water.

Butin (H.). **Untersuchungen über ein Toxin in Kulturfiltraten von Dothichiza populea Sacc. et Br.** [Studies on a toxin in culture filtrates of *D. populea*.]—*Phytopath. Z.*, **33**, 2, pp. 135–146, 1 fig., 4 graphs, 1958. [English summary.]

At the Eidgenössischen Technischen Hochschule, Zürich, it was found that *D. populea* [**37**, p. 684] can be grown in various synthetic culture solutions by adding extracts of malt or yeast. Media suitable for good growth gave the highest yields of toxin, which was extracted from the culture filtrate with acid ethyl acetate and obtained as an oily, partly crystalline product. Its inhibitory effect was quantitatively determined by the *Ustilago zeae* [*U. maydis*] spore germination test [**32**, p. 32] and by a growth inhibition of *Bacillus subtilis*, the effect of the toxin decreasing with an increase in pH, and being reversibly inactivated in the alkaline region. In a wilt test with tomato shoots a pH of up to 6 allowed damage to the stems; with an increase in pH the leaves were damaged. On the bark of *Populus robusta* an aqueous solution of the toxin produced damage similar to the natural dieback caused by *D. populea*. With a number of *Populus* vars. there is no relation between susceptibility to the disease and to the toxin; strongly resistant and strongly susceptible vars. were both equally sensitive to the toxin. The difference in susceptibility is therefore determined by a different resistance towards the parasite itself.

Butin (H.). **Über die auf Salix und Populus vorkommenden Arten der Gattung Cryptodiaporthe Petr.** [On the spp. of the genus *Cryptodiaporthe* occurring on *Salix* and *Populus*.]—*Phytopath. Z.*, **32**, 4, pp. 399–415, 4 fig., 1 graph, 1958. [English summary.]

Cultural studies at the Institut für Spezielle Botanik, Zürich, showed that *C. salicina* is a collective name including 3 independent spp.: *C. apiculata* (conidial state *Fusicoccum leucostomum*), occurring on *Salix* and *Populus* spp., is only saprophytic; *C. populea* (conidial forms *Chondroplea*, also known as *Dothichiza populea*) [**37**, p. 188] on *P.* spp. is mostly parasitic; and *Cryptodiaporthe pulchella* (a comb. nov. for *Diaporthe pulchella* Sacc.; conidial state *Discella coronata*) is saprophytic on *P.* spp. *C. salicella* (conidial state *D. carbonacea*) is sometimes parasitic on *S.* spp. The full synonymy of each species is given.

Glukhovskiĭ (P. S.). Распространение рака у Лиственницы и борьба с ним. [The spread of Larch canker and its control.]—Лесн. Хоз. [*For. Econ.*], *1957*, 12, pp. 49–50, 1957. [Abs. in *Referat. Zh. Biol.*, *1958*, 13, p. 205, 1958.]

In Minsk forests, U.S.S.R., a severe outbreak of larch canker (*Dasyscypha* [*Trichoscyphella*] *willkommii*) [**34**, p. 6] occurred on the branches and the trunks of young trees. Recommendations are made for mixed plantations of larch in sparse spacing with strict observance of agrotechniques.

Zak (B.). **Littleleaf of Pine.**—*For. Pest Leafl. U.S. Dep. Agric.* 20, 4 pp., 1 fig., 1 map, 1957.

A concise account of the littleleaf disease of pine associated with *Phytophthora cinnamomi* in the U.S.A., general information on which has already been noticed [**36**, p. 220].

Zak (B.) & Campbell (W. A.). **Susceptibility of Southern Pines and other species to the littleleaf pathogen in liquid culture.**—*For. Sci.*, **4**, 2, pp. 156–161, 2 fig., 1 graph, 1958.

In a study of littleleaf disease at the Southeastern Forest Exp. Sta., Athens, Georgia, seedling roots of shortleaf and loblolly pines (*Pinus echinata* and *P. taeda*) showed, respectively, 57% infection of 385 root sections (the tip 1 cm. and the next 2 cm.) and 39% of 457 sections after 7 days in liquid medium infested by zoospores of *Phytophthora cinnamomi* [cf. **37**, p. 381] cultured on cooked wheat grains. In a similar study roots of shortleaf, loblolly, slash (*Pinus elliotii*), and longleaf (*P. palustris*) pines were heavily attacked, while those of Arizona cypress (*Cupressus arizonica*) and redbud (*Cercis canadensis*) were only slightly infected, and sweetgum (*Liquidambar styraciflua*) escaped infection.

Boyce (J. S.). **Twig blight of Eastern White Pine caused by Monochaetia pinicola.**—*Phytopathology*, **48**, 9, pp. 516–517, 1 fig., 1958.

M. pinicola [cf. **8**, p. 66], isolated from a twig blight of seedlings and saplings of *Pinus strobus* in Avery County, N. Carolina, induced cankers on this host, which are not, however, of economic importance. *Caliciopsis pinea* [cf. **18**, p. 827], occasionally found in the same cankers, is probably confined as a rule to larger twigs.

Leaphart (C. D.). **Pole blight—how it may influence Western White Pine management in light of current knowledge.**—*J. For.*, **56**, 10, pp. 746–751, 1958.

Research on pole blight of *Pinus monticola* [**38**, p. 40] in Canada and the U.S.A. is reviewed. The disease is accompanied by the deterioration of the fine root system; it occurs on shallow soil with average available moisture capacity of 3·32 in., and has been correlated with soil moisture recharge potential (availability of

underground water), summer precipitation, and temperature [cf. **35**, p. 132]. As no associated fungus, virus, or insect has been found, a physiological cause is indicated. Recommendations for future stand management are outlined.

Harrison (W. C.) & Hendrix (J. W.). **Influence of soil types on the response of Ponderosa Pine to atmospheric fluorides.**—Abs. in *Phytopathology*, **48**, 8, p. 393, 1958.

The reaction (needle scorch) of some 160 3-yr.-old *Pinus ponderosa* seedlings to a fluoride polluted atmosphere [**37**, p. 337] near Mead, Washington, in 1957, varied, plants in soils of medium porosity being more susceptible than those in soils with extremely large or small particles.

Cobb (F. W.). **Pitch streak—a disease of turpentined Slash Pine.**—*Nav. Stores Rev.*, **67**, 9, pp. 4–5, 1 fig., 1 graph, 1957. [Received Sept. 1958.]

Pitch streak of slash pine (*Pinus elliottii*) and occasionally of longleaf pine (*P. palustris*), in the naval stores belt of Georgia and N. Florida, affects on an average 7·4% of turpentined trees, but 50% in some stands. Initially it produces pitch soaking of the inner bark and wood above the face, followed by dry areas extending upwards from the face in streaks in a flame-like pattern, within which only pockets of gum may appear. Limited pitch-soaked areas may appear near the major streaks, extending upwards along the bole and affecting most of the circumference of the tree. Subsequently bronzing of the needles, thinning of the crown, and eventual death of the tree occurs. The cause of the condition is unknown.

Noskov (V. I.) & Negrutskiĭ (S. F.). К вопросу о происхождении ведьминых, метел на Сосне. [On the question of the origin of witches' broom on Pine.] —Науч. Зап. Воронежск. лесотехн. Ин-та [*Nauch. Zap. Voronezh. lestotech. Inst.*], **15**, pp. 207–210, 1956. [Abs. in *Referat. Zh. Biol., 1958*, 10, p. 196, 1958.]

Seeds from diseased pine trees gave 45% seedlings with symptoms of witches' broom in their early stage; 5-yr.-old saplings were up to 3 times smaller than those from healthy seeds. The disorder is considered to be a genetic bud variation or sport.

Van Vloten (H.). **Ziekten en plagen (4. Pseudotsuga taxifolia).** [Diseases and pests (4. *P. taxifolia*).]—*Ned. BosbTijdschr.*, **30**, 5, pp. 145–149, 1958.

This is one of a series of papers presented at a conference on Douglas fir [*Pseudotsuga menziesii*] in 1957. In connexion with the cultivation of the tree in the Netherlands information on its pathology is summarized. Prospects are considered to be hopeful as long as due attention is paid to the selection of healthy planting material.

Davidson (A. G.) & Redmond (D. R.). **Decay of Spruce in the Maritime Provinces.** —*For. Chron.*, **33**, 4, pp. 373–380, 1 map, 1957. [Received Oct. 1958.]

Examination of spruce trees, 409 white (*Picea glauca*), 653 red (*P. rubens*), and 51 black (*P. mariana*), in 1949–51 indicated that volume decay was greater in white spruce, but in neither white nor red was it big enough to influence the selection of rotation ages based on individual growth increments. Butt decaying fungi (*Poria subacida* and *Polyporus tomentosus* from white butt rots in red spruce and *P. tomentosus* and *Corticium galactinum* [**37**, p. 116] from similar rots in white), which entered via roots, caused more damage than the trunk decaying fungi (*Fomes pini* and *Stereum sanguinolentum*), for which branch stubs, and wounds also in red spruce, served as entry points. Fungi found associated with decay are listed.

Bakshi (B. K.), Singh (B.), & Gibson (Shelagh). **Occurrence of Trametes sepium in India.**—*Canad. J. Bot.*, **36**, 5, pp. 603–606, 1 pl. (5 fig.), 9 fig., 3 diag., 1958.

This description of *T. sepium* [cf. **2**, p. 589; **3**, p. 692; **22**, p. 233] from the Western Himalayas on structural timber of deodar is a new record for India. It was identified by interfertility tests between American and Indian collections of the fungus.

Gebisch (R.). **Holzzerstörende Insekten und Pilze an verbautem Holz und in Holzmöbeln.** [Wood-destroying insects and fungi on constructional timber and in wooden furniture.]—*Prakt. Chem.*, **9**, 4, pp. 156–157, 1958.

Essential information is summarized in connexion with dry rot [*Merulius lacrymans*], the chief fungal pathogen not only of soft and hardwoods but also of other cellulosic materials in Austria. It grows at the rate of 6 mm./day and spores are formed at a moisture content of 20% upwards, while one of 5% suffices for infection by means of the rhizomorphs.

Wazny (J.). **Studien über die Einwirkungen von Merulius lacrymans Wulf. Fr. und Coniophora cerebella Pers. auf die mechanischen Eigenschaften befallenen Holzes.** [Studies on the effect of *M. lacrymans* and *C. cerebella* on the mechanical properties of infected wood.]—*Holz a. Roh- u. Werkst.*, **16**, 8, pp. 285–288, 16 graphs, 1958.

Investigations at the Institut für Holzpathologie und Holzkonservierung, Warsaw, into wood infection by *M. lacrymans* [**37**, p. 323] and *C. cerebella* [*C. puteana*: loc. cit.] showed that the impact bending strength decreased most of all, followed by bending strength, crushing strength, and hardness. Blocks $20 \times 20 \times 20$ mm. for crushing strength, $300 \times 20 \times 20$ mm. for static bending, and $80 \times 50 \times 50$ mm. to test for impact bending and hardness were brought to 12% humidity, sterilized, and placed on cultures of the 2 fungi maintained at 22–25° C. and 75% R.H. (air) for 6 months. All mechanical properties were more affected by *C. puteana* than by *M. lacrymans*, excluding hardness which was equally influenced by both. The greatest resistance to the strength decreasing effect was shown by oak, followed by pine heartwood. Pine sapwood, spruce, and beech were less resistant.

Van Groenou (H. B.) & Bellmann (H.). **Zur Frage der Imprägnierung feuchter Buchenschwellen.** [On the impregnation of green Beech sleepers.]—*Holz a. Roh- u. Werkst.*, **16**, 6, pp. 229–233, 5 fig., 4 graphs, 1958. [English summary.]

Experiments at the Laboratorium für Holzkonservierung der Rütgerswerke A.G., Mannheim, Germany, showed that a satisfactory creosoting of green beech sleepers is possible. They are treated in a cauldron with creosote initially at 60–70° C. and heated gradually (1–3 hr.) to 95–100°. Vacuum is then gradually created, brought to max. within approx. 1 hr., and held for a period which varies according to circumstances; the creosote is then returned to the preheater. This is followed by normal Rüping impregnation, with an oil pressure period 1–3 hr. according to the duration of the pre-treatment. The main features of this process are the favourable effect on crack-forming, a higher creosote absorption, and the duration of the creosote bath and of the oil pressure depending on density and final moisture content. The process has advantages particularly for sleepers with medium moisture content, the time for the rather short oil bath and the single Rüping treatment not greatly exceeding the time necessary for the Rüping double treatment.

Hof (T.). **Het conserveren van hout voor de tuinbouw.** [The preservation of wood for horticulture.]—*Meded. Dir. Tuinb.*, **21**, 1, pp. 17–26, 2 fig., 4 graphs, 1958. [English summary.]

Of about 20 non-phytotoxic wood preservatives tested at the Houtinstituut T.N.O.,

Delft, Netherlands [cf. **36**, p. 562], for use in greenhouses, frames, and the like, after a satisfactory performance in *in vitro* tests against *Coniophora puteana* and *Polyporus vaporaria* [*Poria vaporaria*], the most efficient were found among the pentachlorophenol, copper naphthenate, and barely leachable, water-soluble groups [the composition of the last-named being unspecified]. Application under pressure or 7 days' immersion is recommended.

McKnight (T. S.) & Merrall (Elizabeth). **Fungistatic effectiveness and leachability of copper abietate and formate preservatives.**—*For. Prod. J.*, **8**, 9, pp. 256–257, 1 graph, 1958.

At the Ottawa Laboratory, Forest Products Laboratories of Canada, $\frac{3}{4}$ in. cubes of red pine sapwood were used in soil-block tests (duration 3 months) to determine the protection afforded by copper abietate (6·4% Cu by wt., prepared from wood rosin [cf. **34**, p. 421]) and a commercial copper formate product (26·8% Cu) against the Cu-tolerant *Poria monticola*.

The abietate prevented decay, but blocks treated with the formate decayed readily at contents as high as 0·25 lb./cu. ft. The leachability of Cu from the blocks treated with abietate was unaffected (8·7–11·9% total Cu) by steaming at 121° C. and was less than in the blocks treated with Cu formate (19–28·4%) even after fixing by steaming [cf. Smith *et al.*, *For. Prod. J.*, **6**, p. 340, 1956]. The loss from formate-treated blocks was 56·1% before heat treatment, but was lessened by steaming; dry heat at 121° on dry blocks did not fix the preservative, so it seems that water plays a part in the process. A dosage of 0·136 lb. Cu/cu. ft. (as Cu abietate) reduced decay to 11·9% of that in controls: higher dosages added little.

Zabel (R. A.) & Moore (R. A.). **Relative effectiveness of several oil-soluble wood preservatives : condition of dip-treated stake and boardwalk assemblies exposed one year to decay and termite attack.**—*For. Prod. J.*, **8**, 9, pp. 258–263, 3 fig., 1958.

In these field tests started by the New York State University College of Forestry, Syracuse, in 1956, stakes (2×4×18 in.) and boards (1×4×18 in.) of *Pinus ponderosa* sapwood were given dip treatments (15 sec. and 10 min.) and pressure treatments with 5 preservatives (100 lb./sq. in. for 1 hr. for those with light oil carriers and 150 lb. for heavy oils, which needed preheating to 150° F.).

The overall conclusion from 1st year inspections (early Feb. at Gainesville, Florida, and mid-May at Syracuse) was that there was no [fungal] decay or termite attack on stakes pressure-treated to approximate threshold retentions, with one exception, and that dip treatments were ineffective. Decay in the two areas was very uniform, and the order of effectiveness of the preservatives was also similar, but there were major differences in the decay flora, 77% at Gainesville being white rot and 94% at Syracuse brown rot. At Gainesville decay greatly exceeded termite damage.

The most effective preservatives in both regions were 5% pentachlorophenol [**33**, p. 127], 2% copper naphthenate [**34**, p. 333], and 7·5% rosinamine D pentachlorophenate [cf. **33**, p. 329]; 1% copper-8-quinolinolate was intermediate and 5% zinc alkalyl sulphonate the least effective. No decay developed in untreated specimens sited a few in. above the ground whereas those in contact with the soil failed completely, even when dipped.

Cause and prevention of blue stain in wood.—*Tech. Notes U.S. For. Prod. Lab.* 225, 4 pp., 1958.

This revised edition deals with practical methods of protecting logs or lumber against blue stain, caused by fungi parasitic in sapwood. Logs can be treated chemically [cf. **36**, p. 626], and a number of proprietary compounds and their

manufacturers are noted; lumber and timbers can be treated similarly, or kiln dried.

Scheffer (T. C.). **Control of decay and sap stain in logs and green lumber.**—*Rep. For. Prod. Lab., Madison*, 2107, 13+13 [unnumbered] pp., 8 fig., 1958.

A short account of the damage caused by fungi [**37**, p. 322] and the basic aims of control is followed by practical directions, particularly concerning chemical treatment of logs and lumber and their protection in storage. Formulations of treating solutions and some costings are appended.

Blew (O. J.) & Kulp (J. W.). **Comparison of wood preservatives in Mississippi post study. (1958 Progress Report.)**—*Rep. For. Prod. Lab., Madison*, 1757, 14+4 [unnumbered] pp., 1 fig., 1958.

The annual report on the long-term trials of preservatives on posts of southern yellow pine [cf. **37**, p. 255].

Blew (O. J.). **Comparison of wood preservatives in stake tests. (1958 Progress Report.)**—*Rep. For. Prod. Lab., Madison*, 1761, 8+42 [unnumbered] pp., 1 fig., 1958.

This report is on the usual lines [cf. **37**, p. 124].

Baechler (R. H.). **How to treat fence posts by double diffusion.**—*Rep. For. Prod. Lab., Madison*, 1955, 6 pp., 2 fig., 1958.

A revision of an earlier bulletin [**34**, p. 828; cf. **36**, p. 740].

List of publications on wood preservation.—*Publ. For. Prod. Lab., Madison*, 704, 20 pp., 1958.

A list of titles of articles giving general information and the results of research by the Laboratory on preservative materials, methods of application, durability, and service records of treated and untreated wood.

Cowling (E. B.). **A review of literature on the enzymatic degradation of cellulose and wood.**—*Rep. For. Prod. Lab., Madison*, 2116, 26 pp., 1958. [84 ref.]

A brief introduction to the nature of enzymes and their action, and to the structure and properties of cellulosic materials in relation to enzymatic degradation, is followed by an account of present knowledge concerning cellulolytic enzymes.

Havlíčková (Vlasta) & Rypáček (V.). **Enzymy dřevokazných hub I. Zjišťování oxydačních exoenzymů.** [The enzymes of wood rotting fungi I. Identification of the oxidizing exoenzyme.]—*Čes. Mycol.*, **11**, 2, pp. 96–102, 4 fig., 1957. [Russian and German summaries.]

Experiments at the University of Brno, Czechoslovakia, showed that guaiacol and α-naphthylamine are the best reagents for colour tests of the enzymatic properties of lignin-rotting fungi as their coloration is stable and both can be used in dry and liquid media. *Trametes gibbosa* was used as the test organism for 10 different compounds. The reactions when grown on an agar medium containing 0·03% guaiacol or α-naphthylamine for 7 days at 25° C. were red and blue-violet, respectively.

French (D. W.) & Christensen (C. M.). **Nature and cause of spots on coated insulating boards.**—*T.A.P.P.I.*, **41**, 6, pp. 309–312, 6 fig., 1958.

At the Dept of Plant Pathology, University of Minnesota, St. Paul, the surface of discoloured (mostly light to dark brown), circular to irregular spots, up to 1·5 cm. diam., on coated insulating board was found on staining with methylene blue (with

or without safranin) to be uniformly covered with mycelium. The fungus isolated from small pieces of spotted coating on malt agar containing 7·5–15% NaCl or Czapek's with 20–40% or more sucrose was tentatively identified as a member of the *Aspergillus restrictus* series. Inoculation of new coated board resulted in the development within 6 months of spots closely resembling those occurring on material in service, but took place only at R.H. 75–80%; it was not prevented by preservative treatment with 0·29–0·51% pentachlorophenol. *A.* (?) *restrictus* was re-isolated from the spotted areas.

Slime prevention in paper mills.—*Paper Making*, **76**, 4, pp. 47–48, 1957–8.

Information is summarized from a booklet recently circulated by the Laboratory Chemicals Division of British Drug Houses Ltd. concerning the advantages of panacide (dichlorophene) and the results of laboratory tests and mill experiments in the United Kingdom [cf. **34**, p. 800 *et passim*]. The chemical was shown to be active at less than 200 p.p.m. against such typical occupants of paper slime as *Aspergillus niger* and *Penicillium expansum* [**38**, p. 42]. Solutions of sodium carboxymethyl cellulose were preserved by the addition of 100 p.p.m. panacide, whereas the untreated yielded *Verticillium cinnabarinum*, *P. cyclopium*, *P. notatum*, *P. formiculorum*, *A. versicolor*, and *A. sydowii*.

In mill A (machine chest addition) the counts/ml. before treatment, 6 hr. later, and after 2 months' running were 1,500,000, 50,000 and 9,000 micro-organisms, respectively. In mill B (pulper addition) the pre-treatment population was 2,100,000, 24 hr. later 550,000, and after 9 months' running 88,000. In mill E comparative trials with economically equivalent doses of panacide and an organo-mercurial alternately gave average weekly counts of 2,000,000–17,000,000/ml. for 4 runs with the former as against 17,000,000–43,000,000 with the latter.

As a rough guide, about 1–1½ oz. panacide is required for every ton of pulp (dry wt. basis) or 70–100 ml. of a 40% solution.

Burckhardt (F.). **Untersuchungen über das Kräuselmosaik an Kohlrübe, Stoppelrübe und Markstammkohl.** [Studies on crinkle mosaic in Swede, Turnip, and Marrow Stem Kale.]—*Phytopath. Z.*, **33**, 2, pp. 203–221, 9 fig., 1958. [English summary.]

From their symptoms, various isolates of this virus from swede and turnip from N.W. Germany could be identified at the Institut für Hackfruchtkrankheiten und Nematodenforschung, Munster, Germany, as turnip crinkle mosaic virus [**38**, p. 44] which, from its thermal death point and serology, belongs to the turnip virus 1 group [turnip mosaic virus: loc. cit.]. Following inoculations by sap transmission and *Myzus persicae* max. yield depressions of turnip and swede were 60–70%, the former method causing considerably greater growth depression than the latter. Crinkle mosaic of different provenance caused different degrees of damage to the plant; turnip was more susceptible than swede. On marrow stem kale, sap or *M. persicae* infection caused only slight symptoms without marked reduction of growth, but tests back to turnip and swede showed that the plants did contain the virus; thus marrow stem kale showed a high degree of tolerance. Treatment with metasystox in 1956 resulted in considerably higher yields of both early- and late-sown swede severely infested by *M. persicae*. In the Ems plain between Warendorf and Lingen swede was highly infected in 1956.

Bochow (H.). **Beiträge zur Frage des Einflusses einer organischen Düngung auf den Befall von Pflanzen durch parasitische Pilze. I. Über den Einfluß verschiedener Kompostgaben auf den Herniebefall (Plasmodiophora brassicae Wor.).** [Contributions to the question of the influence of organic manuring on the infection of plants by parasitic fungi. I. The influence of different doses of compost on

club root (*P. brassicae*) infection.]—*Phytopath. Z.*, **33**, 2, pp. 127–134, 5 fig., 1 graph, 1958. [English summary.]

In pot experiments under field conditions at the Institut für Phytopathologie und Pflanzenschutz, University of Rostock, Germany, the addition 3–5% w/w of 2-yr.-old garden compost (pH 7·1) to a sandy soil slightly infested (by the addition of 4, 8, or 15% soil at pH 6·5 naturally infested with *P. brassicae*) [**35**, p. 737] produced a slight increase in the incidence of club root in white mustard (*Sinapis alba*) as follows: without compost 50·22%, 3% compost 52·96%, and 5% compost 57·37% infected plants. An increase of compost (10, 20, or 40%) caused a reduction to 49·83, 40·48, and 27·57% infection, respectively. The reduction was less in a more highly infested soil (30 to 60% naturally infested soil).

Yukawa (Y.). **Electron-microscopic studies on the club-root tissues of crucifers.**—*Bull. Fac. Agric. Yamaguti Univ.* 8, pp. 659–664, 8 fig., 1957. [Japanese. Abs. from English summary. Received Nov. 1958.]

Rod-shaped mitochondria ($0{\cdot}3 \times 1{\cdot}5\,\mu$) were observed in the plasmodia of *Plasmodiophora brassicae* [cf. **35**, p. 858] in root tissues of Chinese cabbage. The uninucleate spores formed from the plasmodium had dense, granular cytoplasm and spines on the outer surface.

Yukawa (Y.). **Respiratory metabolism of the club-root tissues of crucifers.**—*Bull. Fac. Agric. Yamaguti Univ.* 8, pp. 665–672, 3 graphs, 1957. [Japanese. Abs. from English summary. Received Nov. 1958.]

The O_2 and CO_2 uptake values (ml./hr./mg. dry matter), determined by the Warburg method, differed significantly in healthy and club-root (*Plasmodiophora brassicae*) infected root tissue of Chinese cabbage, the corresponding values being 4·65 and 4·78 as opposed to 7·8 and 7·26. Addition of M/10 glucose to the substrate produced an increase in the respiratory rate, the RQ for endogenous respiration being slightly higher than that for exogenous. The RQ of leaves of infected plants was smaller than that of healthy ones, a possible cause of wilting in diseased plants, due to increased respiration of the roots and shortage of water from the gall tissues.

Yukawa (Y.). **Accumulation of radioactive P^{32} and detection of dehydrogenase activities in club-root tissues of some crucifers.**—*Bull. Fac. Agric. Yamaguti Univ.* 8, pp. 673–678, 1 pl., 1957. [Japanese. Abs. from English summary. Received Nov. 1958.]

The accumulation of P^{32} detected by auto-radiography and the dehydrogenase activity (from histochemical analysis) in club roots (*Plasmodiophora brassicae*) of Chinese cabbage and turnip were closely correlated with one another and were higher in tissues containing active plasmodia than those with resting spores.

Schmidt (Trude). **Auch der Chinakohl ist vor Krankheiten nicht gefeit!** [Even Chinese Cabbage is not immune from disease!]—*Pflanzenarzt*, **11**, 6, pp. 73–74, 2 fig., 1958.

A popular note on infection of Chinese cabbage by *Cercosporella brassicae*, a disease occurring occasionally in Austria.

Bennett (C. W.). **Influence of different combinations of tops and roots of susceptible and resistant varieties of Sugar Beet on curly top symptoms and virus concentration.**—*J. Amer. Soc. Sug. Beet Technol.*, **9**, 7, pp. 553–565, 2 fig., 1957.

At Salinas, California, the 4 possible graft combinations of tops and roots of the sugar beet vars. R. & G. Old Type (susceptible) and S. L. 68 (resistant) were inoculated with curly top virus strain 3 [**17**, p. 786; **37**, p. 194] by cageing infective *Circulifer tenellus* on 1 leaf/plant.

Under greenhouse conditions the rate of growth, type of symptoms (usually none in S.L. 68), and amount of virus (estimated by leafhopper transmission) in the tops were unrelated to root resistance, the virus conc. being much higher in susceptible tops. Virus conc. in a new, etiolated, resistant top growing in the dark from a susceptible root after the original resistant top had been removed was almost equal to that of susceptible side shoots growing from the same root in the light, though no symptoms developed; the conc. fell on transference to the light. Strain 1 of the virus attained a much higher conc. in S.L. 68 than did strain 3 and produced recognizable symptoms.

Giardini (A.) & Antonelli (C.). **Prove di lotta contro la Cercospora nel 1956.** [Experiments on the control of *Cercospora* in 1956.]—*Industr. saccar. ital.*, **50**, 5–6, pp. 110–120, 1957.

This is a detailed, fully tabulated report of further experiments on the chemical control of *C.* [*beticola*] on sugar beet in a heavily infected Po valley area [**35**, p. 259; **37**, p. 430]. The favourable results substantiated those of previous trials in respect of all the fungicides, except 1 based on thiram. The effective preparations included 7 Cu-containing, 2 without Cu, i.e. thiazene (80% zineb) and parzate, and 2 mixed. Treatments should number 2–3 at a min. of 2 kg./ha. The beneficial effects are most noticeable in the very susceptible (Klein E.) and susceptible (Maribo) vars. but they also extend to the resistant Mezzano P and very resistant Buszczynski C.L.R.

Johnson (K. W.) & Hagedorn (D. J.). **The inheritance of resistance to Bean virus 2 in Pisum sativum.**—*Phytopathology*, **48**, 8, pp. 451–453, 1958.

At the University of Wisconsin, Madison, the pea vars. Perfected Wales and Thomas Laxton, susceptible to pea mosaic virus, were crossed with each of the resistant New Era, Pride, Wisconsin Early Sweet, and Wisconsin Perfection [cf. **36**, p. 158] and the reciprocal F_1 hybrids, F_2 bulk, and F_3 and F_4 progenies from, respectively, single F_2 and F_3 plants were sap inoculated with pea mosaic virus. The results indicate resistance to be controlled by a single recessive gene. Some deviations from predicted ratios were attributed to a probable delayed symptom expression in the susceptible heterozygotes.

Mitchell (J. W.), Smale (B. C.), & Porter (F. M.). **Effect of some substituted carbamates on symptom development in stems of Bean infected with southern Bean mosaic virus.**—*Phytopathology*, **48**, 9, pp. 517–518, 1 diag., 1958.

In further studies at Beltsville [cf. **36**, p. 630] it was shown that in the suppression of bean southern mosaic virus symptoms in Pinto bean [*Phaseolus vulgaris*] by the furfuryl esters of 2-methyl-5-chloro-carbanilic and carbanilic acids unsaturation of the furfuryl groups was essential. Also effective were the isopropylesters of 2,4-dinitro-5-chlorocarbanilic and 2,4-dinitrocarbanilic acids.

Staples (R. C.) & Ledbetter (M. C.). **A study by microautoradiography of the distribution of tritium-labeled glycine in rusted Pinto Bean leaves.**—*Contr. Boyce Thompson Inst.*, **19**, 4, pp. 349–354, 2 fig., 1958. [17 ref.]

In these studies of primary Pinto bean (*Phaseolus vulgaris*) leaves experimentally infected with bean rust (*Uromyces phaseoli*) [*U. appendiculatus*] the data obtained indicated that an increase in glycine incorporation at the site of infection took place primarily in the fungus mycelium rather than in the host tissue.

Wilson (E. M.) & Ark (P. A.). **The effect of chlorophyll on the phytotoxicity of acti-dione on Bean.**—*Plant Dis. Reptr*, **42**, 9, pp. 1069–1070, 1958.

At the Dept of Plant Pathology, University of California, Berkeley, increasing concs. of chlorophyll in aqueous solutions of 10 p.p.m. actidione [**37**, p. 639]

reduced its phytotoxicity to Pinto and Bountiful beans [*Phaseolus vulgaris*] without affecting fungicidal activity; spray mixtures containing 1,000 p.p.m. chlorophyll caused no injury and conferred complete protection against subsequent infection by *Erysiphe polygoni* [**37**, p. 128]. Bio-assay of sap against *Saccharomyces cerevisiae* indicated that most of the active materials remained on the plant surface.

Kefford (R. O.). **French Bean seed certification. List of growers 1957–58.**—*J. Agric. Vict.*, **56**, 9, pp. 608–611, 4 fig., 1958.

During a meeting at Orbost in July 1957, growers decided that drastic action was necessary to protect bean [*Phaseolus vulgaris*] crops from seed-borne diseases, especially the most serious in Victoria, halo blight (*Pseudomonas medicaginis* var. [f. sp.] *phaseolicola*). It was agreed that sowings in 1957–8 should be restricted to certified seed (except for a few resistant vars. available) and that uncertified crops should be sprayed at 2-week intervals with 6:8:100 Bordeaux mixture. The latter measure reduced diseased plants to a very low figure and gave a big acreage of clean seed, even from crops slightly affected by halo blight but free from anthracnose (*Colletotrichum lindemuthianum*). This will be designated 'Board Approved Seed' and will be used for the production of green beans.

Afanasiev (M. M.) & Sharp (E. L.). **Effect of various bactericidal sprays on control of halo blight disease of Garden Beans.**—*Plant Dis. Reptr*, **42**, 9, pp. 1071–1073, 1958.

In further tests at Bozeman, Montana [cf. **31**, p. 476], Topcrop bean (*Phaseolus vulgaris*) seed free from *Pseudomonas* [*medicaginis* f.sp.] *phaseolicola* was sown on new ground, adjacent infector rows being sown with infected seed and later sprayed with a suspension of the bacterium. Mild infection in 1956 was controlled by agrimycin (100 p.p.m.), which produced the best yield, microgel (18 g./gal.), captan (18·2), and Bordeaux (71), each applied at 250 gal./acre 4 times during the growing season. In 1957, when infection was severe, Bordeaux gave outstanding results with yields more than double those from any other treatment; agrimycin, used only at 50 p.p.m., was ineffective.

Napier (Eunice J.), Rhodes (A.), Turner (Dorothy I.), Tootill (J.), & Dunn (A.). **Systemic action of captan against Botrytis fabae (chocolate spot of Broad Bean).**—*J. Sci. Fd Agric.*, **8**, pp. 467–474, 1 diag., 1957. [Received 1958.]

In order to use captan [**37**, pp. 263, 574] as a standard in assaying antifungal antibiotics, studies were made at the Glaxo Laboratories, Stoke Poges, to estimate its persistence and efficacy as a systemic fungicide against chocolate spot of broad bean [**36**, p. 709]. In root applications 100 ml. captan suspension (50% w/w commercial wettable powder or 90% technical captan, the latter being slightly less effective) were watered into pots on 3 successive days before foliage inoculation on the 4th day; spray applications (generally with a wetter) were restricted to 1–4 days before inoculation with the 2 lower concs. (1 or 2 mg./ml.), but longer intervals were allowed when 8 mg./ml. was used. Systemic translocation of the fungicide was proved and the antifungal effect was shown not to be due to vaporization of captan. It was detectable up to 16 days after treatment. Efficacy increased with conc., but marked effects were produced even at 0·05%. Root applications lowered the mean lesion counts on leaves. Captan was toxic to tomato plants at 0·5 mg./ml.

Purss (G. S.). **Studies on varietal resistance to stem rot (Phytophthora vignae Purss) in the Cowpea.**—*Qd J. agric. Sci.*, **15**, 1, pp. 1–14, 6 fig., 1958.

Pot tests, nursery-plot tests, and field trials at the Division of Plant Industry, Queensland, on the reaction of cowpea vars. and other legumes (in pot tests only) to stem rot (*P. vignae*) [**37**, p. 433] indicated that the disease may be avoided by using resistant vars. [**36**, p. 307]. Poona and Reeves were susceptible under all

test conditions. Malabar, Giant, and certain others were susceptible in pots, but gave a variable reaction in the field, depending upon whether or not conditions favoured the pathogen. A 3rd type, including Blackeye 5 and Havana, exhibited complete resistance, which in Blackeye 5 was dominant over Poona's susceptibility. All the tropical and subtropical legumes so far tested appear to be resistant.

Johnson (H. W.), Means (U. M.), & Clark (F. E.). **Factors affecting the expression of bacterial-induced chlorosis of Soybeans.**—*Agron. J.*, **50**, 10, pp. 571–574, 3 fig., 1958.

Experiments at the Crops and Soil and Water Conservation Research Division, Beltsville, Maryland, on the effect of conc. and proportions of nutrients, 3 different sand substrates, and removal of cotyledons on the expression of bacterial-induced chlorosis in some vars. of soybeans by strains of *Rhizobium japonicum* [**36**, p. 678] indicated that the most susceptible vars., Lee and Hawkeye, developed light to severe chlorosis in all treatments, less susceptible ones, Clark and Blackhawk, light to moderate chlorosis in most treatments, while Harosoy and CNS, previously thought resistant, developed symptoms in 1 treatment (a modification of Crone's mineral solution). Removing the cotyledons of Hawkeye and Blackhawk induced equal chlorosis.

Erwin (D. C.). **Fusarium lateritium f. ciceri, incitant of Fusarium wilt of Cicer arietinum.**—*Phytopathology*, **48**, 9, pp. 498–501, 1 fig., 1958.

A further account from Riverside, California, of this wilt [**36**, p. 445], which has been present in the State for several years. Leaves of affected plants turn grey-green, then dull yellow, and wilt; the xylem and pith become much darkened. On the other hand, the leaves of plants affected by a virus-induced yellows disease (bean yellow mosaic and possibly other viruses) become bright yellow, and discoloration of the stem tissues occurs initially in the phloem. Wilt induced by *Verticillium albo-atrum* [loc. cit.] causes a lighter stem tissue discoloration. The fungus isolated and shown to cause the *F.* wilt was *F. lateritium* [*Gibberella lateritia*], considered the same as Watts Padwick's *F. orthoceras* f. *ciceri*, to which this wilt was attributed in India [**20**, p. 82; **37**, p. 627], and as the pathogen did not affect pigeon pea or *Crotalaria juncea* [cf. **31**, p. 597] it is regarded as a new form. A Californian selection of *C. arietinum* showed promising resistance to the disease.

Kovachevski (I. C.). Сухото гниение по Чесъна и неговият причинител **Botryotinia porri (van Beyma Thoe Kingma) Whetzel.** [Dry rot of Garlic and its causal agent *B. porri*.]—*Bull. Inst. bot. Sofia, 1958*, 4, pp. 331–350, 5 pl., 1958. [German summary.]

Dry rot (*B.* [*Sclerotinia*] *porri*) of garlic in Bulgaria, first observed in the winter of 1948, is especially widespread in the Vidin and Karnobat regions. Pathogenicity was proved by inoculation. The fungus was pathogenic to leek [cf. **32**, p. 416] but onion is rarely infected; on these grounds it may be considered as a new form, *allii-sativae*.

Rich (S.). **Brown-spot of Celery in Connecticut.**—*Plant Dis. Reptr*, **42**, 9, pp. 1091–1092, 1958.

In a field near Hartford typical lesions, on which *Cephalosporium apii* was sporulating heavily, were found on all surfaces of infected stalks [cf. **30**, p. 555]. The disease was favoured by moist, warm weather.

Strong (R. G.) & Rawlins (W. A.). **Aster-yellows virus infection and transmission by Macrosteles fascifrons (Stål) with reference to Lettuce-yellows prevention.**—*J. econ. Ent.*, **51**, 4, pp. 513–515, 1958.

At Cornell University, Ithaca, New York, after 18 days' incubation of the eastern

strain of aster yellows virus (originally isolated from lettuce) [**37**, p. 750] in 6-spotted leafhoppers, no differences were detected in infectivity after feeding periods of 3, 6, and 10 days on China aster. Two viruliferous insects/plant were as efficient as larger numbers for infection. Infective individuals resting on plants for only 10 min. transmitted the virus almost as readily as those caged for 6 hr., but the percentage of infection was considerably higher after 24 hr. (66·7 as compared with 24 and 32 for the 2 shorter periods). Most viruliferous leafhoppers inoculated only 1 plant/24-hr. period of individual confinement to groups of plants. After becoming infective, 70–78% inoculated all plants on which they were confined individually for 12–48 hr. in serial transfers, but such consistent results did not follow 1-hr. confinement periods. Under the experimental conditions no differences in susceptibility were observed between the lettuce vars. Great Lakes 659, Cos or Romaine, Cornell 656, Pennlake, and White Boston or in Early White Giant China aster.

Partyka (R. E.) & Mai (W. F.). **Nematocides in relation to sclerotial germination in Sclerotinia sclerotiorum.**—*Phytopathology*, **48**, 9, pp. 519–520, 1958.

At Cornell University, Ithaca, New York, it was shown that soil applications of DD stimulated sclerotial germination of *S. sclerotiorum* causing 'drop' of lettuce. Sclerotia 5 months old were soaked in water for 2½ hr., mixed with mineral soil, and placed in nylon bags in soil treated with DD at 0–67·5 gal./acre and maintained for 3 days at 65° C. Other sclerotia 16 months old were kept 48 hr. at 100% R.H., then placed in greenhouse soil at 17·6% moisture, with the DD range increased to 90 gal. After surface sterilization with clorox the sclerotia were germinated on sterilized sand. Production of apothecial stipes increased in proportion to the rate of DD, whereas germination as vegetative hyphae decreased. More stipes were formed after treatment with 1,3-dichloropropene than with the other component of DD, 1, 2-dichloropropane; also stimulatory were nemagon, telone, and dorlene at 1–3 times normal field application, but not W-40 (1–2 dibromoethane). These results tally with observed field increases of 'drop' accompanying use of such fumigants.

Louvet (J.) & Dumas (M.). **Contribution à l'étude des agents de pourriture de la Laitue en culture hâtée ou forcée.** [A contribution to the study of the causes of rot of Lettuce grown under rapid or forced cultivation.]—*Ann. Épiphyt.*, **9**, 2, pp. 211–241, 6 fig., 2 graphs, 1958. [45 ref.]

In N. France serious losses of lettuces grown under glass in winter are caused at planting out by *Botrytis cinerea* [cf. **35**, p. 505], which is sometimes also abundantly present on the leaves near the base shortly before harvesting. At this period, however, *Sclerotinia minor* [loc. cit.] causes collar rots and *B. cinerea* is present as a saprophyte on the rotting leaves. In other parts of France similar damage is caused to lettuces in the field by *S. minor* and *S. sclerotiorum* together. *Bremia lactucae* is important chiefly because it predisposes the plants to attack by *Botrytis cinerea*.

The effects of the cultural conditions in which lettuces are grown upon the development of these diseases is considered, and experiments on control are described. Against damping-off of seedlings, steam sterilization of the soil is advised. Preventive dustings with ferbam, thiram, or zineb will reduce attacks by *Bremia lactucae*. If attack by *Botrytis cinerea* occurs the seedlings should be dusted with PCNB or tecnazene during the month before transplanting. Thiram was ascertained to be active against *B. cinerea* and *Bremia lactucae*, but not against *Sclerotinia* spp., against which the best remedy is steam sterilization of the superficial layer of the soil.

Khristova (Eleonora). Антракноза — нова болест по Пипера. [Anthracnose—new disease on Sweet Pepper.]—Овощарство и Градинарство [*Ovoshtarst. & Gradinarst.*], *1958*, 2, pp. 46–47, 2 fig., 1958.

In Oct. 1957, at Gradishte, Pavlikeni region, Bulgaria, anthracnose caused by *Colletotrichum nigrum* [*Glomerella cingulata*: **30**, p. 444] was recorded for the 1st time in Bulgaria, on the 'kapii', 'kambi' and 'izobilie' vars. The disease is spreading alarmingly in some parts of the country. Destroying the diseased plants and using seeds from healthy plants is recommended. Bordeaux mixture (1%) can be applied only after tests on different vars., as some are very easily scorched.

Akai (S.), Yasumori (H.), & Terazawa (H.). **On the resistance of Cucumber varieties to anthracnose and the behaviour of the causal fungus in the invasion of the host tissues.**—*Plant Dis. Reptr*, **42**, 9, pp. 1074–1079, 1958.

Much of this information from the College of Agric., Kyoto University, Japan, has been noticed [**37**, p. 752]. Although fewer leaf lesions developed on the resistant wild cucumber and Sekino No. 2, inoculated with *Colletotrichum lagenarium*, than on the susceptible Su-Yo and Kwachu-Zairai, the rate of enlargement of individual lesions was about the same.

Kefford (R. O.), Smith (P. R.), & Eager (L.). **Rock Melon variety trial.**—*J. Agric. Vict.*, **56**, 9, pp. 599–603, 3 fig., 1958.

In a trial in 1955–6 at the Citrus Research Station, Mildura, Yates Conqueror, Yates Invader (2 new U.S. vars.), and Hale's Best Powdery Mildew Resistant 45 maintained their reputation for resistance to *Erysiphe cichoracearum* [**32**, p. 360; **37**, p. 64]; the 1st 2 are reported to be resistant also to downy mildew [*Pseudoperonospora cubensis*].

Decker (J. P.) & Tió (M. A.). **Photosynthesis of Papaya as affected by leaf mosaic.**—*J. Agric. Univ. P.R.*, **42**, 3, pp. 145–150, 1 fig., 1 diag., 1 graph, 1958. [Spanish summary.]

Comparisons with an apparatus already described (*Plant Physiol.*, **30**, pp. 80–84, 1955) showed that the mean photosynthetic rate of papaw leaves infected by papaw mosaic virus [**36**, p. 706], widespread in S. Puerto Rico, was only 36% of that of normal leaves.

Kennelly (A. G.). **The growing of Mushrooms.**—*N.Z.J. Agric.*, **97**, 2, pp. 145, 147, 149, 151–152, 4 fig., 1958.

Austin (M. D.). **Pests of the cultivated Mushroom. 2. The road to follow.**—*Mushroom News* (W. Darlington and Sons, Ltd., Worthing, Sussex), **7**, 1, pp. 10–15, 5 fig., 1958.

Two popular articles.

Fraser (I. M.) & Fujikawa (B. S.). **The growth-promoting effect of several amino acids on the common cultivated Mushroom, Agaricus bisporus.**—*Mycologia*, **50**, 4, pp. 538–549, 1958.

In further studies [**33**, p. 334] at the College of Medical Evangelists, Loma Linda, California, phenyl-alanine, methionine, and proline promoted the mycelial growth of 3 strains of *A. bisporus* in a liquid medium, the 1st two being the most active on 2 of the strains, while phenyl-alanine and proline were most active with the 3rd. Thiamine was necessary for an appreciable growth response to these acids. Opt. levels for glucose, asparagine, and inorganic salts were determined in relation to the growth response to the amino acid-vitamin mixture.

Storozhenko (E. M.). Меры борьбы с белой гнилью Винограда. [Measures for the control of white rot on Vine.]—Бюл. научно-техн. информ. Краснодарского н.-и. ин-та с.-х. [*Bull. nauch.-tech. inform. nauch.-issled. S.-kh. Inst. Krasnodar*], *1957*, 1, pp. 44–45, 1957. [Abs. in *Referat. Zh. Biol., 1958*, 10, p. 200, 1958.]

A short account is given of white rot [*Coniella diplodiella*] of vine. White Shasla, Murastell, and Kabernet are resistant. A temp. of 25–27° C. and humidity above 70% are opt. for the development of white rot. Recommendations for spraying with thiram, which gave much better results than 4% Bordeaux mixture, are given.

Titles of papers in the Long Ashton annual reports, 1953–1957.—*Rep. agric. hort. Res. Sta. Bristol, 1957*, pp. 163–181, [1958].

An author and subject index.

Report of the 14th International Horticultural Congress—1955. The Hague, Netherlands, 29 Aug.–6 Sept. 1955.—1. lxxix+913 pp., 185 fig., 16 diag., 137 graphs; **2.** 733 pp., 4 col. pl., 165 fig., 11 diag., 122 graphs, 1 col. chart, H. Veenman & Zonen, Wageningen, Netherlands, [1958. English summaries.]

In a contribution on 'Breeding for disease resistance' J. C. Walker (pp. 51–63) surveyed in general terms the history of the subject, giving an account of problems encountered in present day investigations. Under the heading 'Gene centres and the search for resistant breeding material' S. C. Harland (pp. 64–70) considered 3 types of resistance encountered in the genetical reservoirs in the centres of diversity of cultivated spp. in relation to environment, and due to (1) a major 'dictator' gene, (2) a key gene, accompanied by a series of 'modifiers', or (3) the anarchic complex or polygenic system.

In discussing 'Testing methods for breeding for disease resistance' J. C. 's Jacob (pp. 71–81) enumerated the requirements for successful methods and different inoculation techniques.

E. R. Hoare (pp. 130–144), dealing with 'Small volume spraying', discussed break-up of fluid, droplet size in relation to coverage, determination of deposition, and the machines which emit small volumes [**35**, p. 694]. The valuable elements of old-fashioned fruit-growing on farms in S.W. Germany were discussed by H. Thiem (pp. 145–157) under the title 'Stand des Sprüh- und Nebelverfahrens im Obstbau von Deutschland'. He suggested the elimination of the disadvantages of smallholdings by joint activities in efficient disease control and marketing. In 'Spray materials for low-volume spraying' A. F. H. Besemer (pp. 158–166) discussed the influence of water (passive or active), R.H., and wetting agents. In the Netherlands 200 l./ha. at ×10 normal spray conc. is preferred.

G. H. Berkeley (pp. 280–287) commented on the use of 'Virus-free sour and sweet cherry nursery stocks in Ontario' [**32**, p. 437], while R. V. Harris & A. F. Posnette (pp. 288–295) gave an account of 'The production and distribution of virus-free fruit trees [**36**, p. 22] at East Malling'. D. H. M. van Slogteren (pp. 296–302) described 'The selection of virus-free plants from partially infested stocks, with special reference to serological methods' [**35**, p. 480]. G. Morel & C. Martin (pp. 303–310) described [in French] the cure of plants affected with virus diseases by culture of apical meristems as a means of re-introducing vars. [**35**, p. 215] which had succumbed to a virus disease, while P. Brierley (pp. 311–314) elaborated on 'The production of virus-free chrysanthemum stocks' in U.S.A., especially stunt virus disease, by an indexing method [**32**, p. 561]. In 'Immunity breeding in roses' [in German] W. Kordes reports (pp. 355–359) that hybrids of *Rosa moschata* (viz. bush or floribunda roses), briar (*R. canina*), and *R. kordesii* with garden roses are immune from rust [*Phragmidium mucronatum*], mildew [*Sphaerotheca pannosa*],

and black spot [*Diplocarpon roseae*]. E. W. Lyle (pp. 360–366) reported on 'The occurrence and control of powdery mildew, rust, and black spot diseases of roses in the U.S.A.' [**31**, p. 608; **36**, p. 809; **37**, p. 45; **38**, p. 8].

'Transfer of resistance to bean mosaics from *Phaseolus vulgaris* to fertile hybrids obtained from *P. vulgaris* × *P. coccineus*' by W. Rudorf (pp. 446–451) has been noticed [**37**, p. 749]. G. Ordish (pp. 540–545) gave 'Some notes on the economics of crop protection' [**33**, p. 41] in which he enumerated 5 basic principles concerned with the value of the damage in relation to the value of the crop and the methods of control and 5 questions that need to be answered in considering variable factors. P. Miller & S. E. A. McCallan (pp. 546–555), reporting further on 'The use of radioisotopes in studies on pesticide action' [**36**, pp. 542, 708], noted that S was reduced in solution by spores to H_2S and released as such; while the ED_{50} values for different toxicants ranged from 85 to 10,000 μg./g. spores.

L. Bravenboer (pp. 641–646) in 'Soil disinfection with fumigants in glasshouse tomatoes' observed that chloropicrin, when applied to soil by motor injector or by hand in autumn in the Netherlands, not only controlled soil-borne tomato corky root [**37**, p. 739] and *Verticillium* wilt, but also stimulated plant growth, probably as a result of the increase of bacterial population and N-mineralization level in treated soil. DD and ethylene bromide also stimulated growth [cf. **35**, p. 727].

In his review of resistance problems in the genus *Ribes* and possibilities of their solution by breeding intra- and inter-sectional combinations, R. Bauer (pp. 685–696) reported [in German] that resistance of gooseberries and red and black currants to *Sphaerotheca mors-uvae*, *Pseudopeziza ribis*, and *Cronartium ribicola*, respectively, was achieved by crosses involving 46 spp. of the sections Grossularia, Ribesia, and Coreosma. Crosses between gooseberry and mildew-resistant selections of *R. divaricatum* gave mildew-free large-fruited forms highly resistant to other diseases. Similarly, black currant × *R. dikuscha* gave promising seedlings combining resistance to *P. ribis* and *C. ribicola*. Inter-sectional crosses of the more resistant vars. were also successful but often resulted in sterile hybrids, but with colchicine treatment these produced fertile amphidiploids. Virus infection may be avoided by using seed from selfed amphidiploids.

Experimental results of the reactions of *Prunus cerasus* and *P. avium* to infection by *Monilia* are described by M. Zwintscher (pp. 716–734) [in German]; 29 vars. of sour cherry, 11 clones of sweet and sour cherry, 4 standard vars., and 268 seedlings were tested with strain M4 of *Monilinia* [*Sclerotinia*] *laxa* [**35**, p. 897; **36**, p. 197] isolated from Schatten Morelle, the most important var. commercially, and the most susceptible. There is a seasonal change in susceptibility. The decreasing order of susceptibility in cherries is sour, Duke, and sweet; the respective symptoms produced under similar conditions were death of twigs above inoculation wounds, death of some buds near the wound, and gummosis only, due to liquefaction of infected tissue bordering healthy.

Work done by J. R. Shay, D. F. Dayton, L. F. Hough, E. B. Williams, & J. Janick (pp. 735–739) on 'Apple scab resistance' at Purdue University, Indiana, involved the incorporation of major dominant genes for field immunity from *Venturia inaequalis* [**35**, p. 829] in a number of Asiatic *Malus* spp. by modified backcrossing [**35**, p. 419; **36**, p. 192]. So far 3 genes for virulence in natural strains have been defined [**36**, p. 767].

D. Stanković & A. Bećarević (pp. 786–795), reporting from Yugoslavia on 'The study of P metabolism in healthy and diseased fruit trees, determined by radioactive P^{32}', found that P was best applied to trees as leaf sprays, by which it was most efficiently distributed through the plant via the xylem (which had the highest P content). Small amounts of B stimulated P uptake via the roots; *Taphrina deformans*, *V. inaequalis*, and *Clasterosporium carpophilum* increased P metabolism in the leaves of peach, apple, and cherry, respectively, while mosaic

virus increased its metabolism in Italian plum, everywhere except the fruit. Dealing with 'Virus diseases of fruit trees, notes on identification and methods of checking spread', J. D. Atkinson (pp. 800–804) stated that the presence of plum mosaic could be inferred in either scion or stock from their total incompatibility on 4 vars. of Japanese plum [**36**, p. 705] or partially on some apricot vars. Elimination of plum mosaic was achieved within 3 yr. in 1 orchard by roguing and selection of healthy budwood. Cross protection against apple mosaic, of which more than 1 strain occurs in New Zealand, is provided by bud failure if affected wood is used for budding. Stony pit of pear [**37**, pp. 90, 487] did not appear in healthy trees until 2 seasons after grafting with infected scions. Information from C. H. Cadman (pp. 805–809) on 'Ringspot virus diseases of raspberries' has been noticed [**35**, p. 618; **37**, p. 200].

In 'Contribution a l'étude de l'*Armillariella* [*Armillaria*] *mellea* en Serres à vignes' R. Delhaye (pp. 810–818) reports that the fungus, from disinfected pieces of rhizomorph, grew best on oatmeal in water. *Trichoderma viride* grew and sporulated best on celery leaf extract and on sterilized peat; agitating culture flasks checked its growth. No practical method was found for controlling *A. mellea* on vine by *T. viride*, but brushing longer roots with 1% organo-mercuric salt solution and spraying the soil with 0·5% at 10 l./sq. m., or spraying soil with a solution of neutral *o*-oxyquinoline sulphate (200 p.p.m.) at 10 l./sq. m. 3 times at monthly intervals are recommended.

H. Reich (pp. 819–826) discussed [in German] the advantages and disadvantages of important organic fungicides for the control of *Fusicladium* on apple [*V. inaequalis*] and pear [*V. pirina*].

H. J. Wezenberg (pp. 970–978), dealing with 'Mineral deficiencies in floricultural crops at Aalsmeer', Netherlands, stated that most are due to a lack of trace elements. Mn and Fe deficiencies occur in roses and chrysanthemums; lowering the pH prevents these, and also Mn deficiency in lilac. Mg deficiency in lilac planted in a thin layer of black earth on acid clay can be corrected by increasing the black earth layer. *Prunus triloba* is occasionally affected by a dying of the terminal buds, probably induced by Cu deficiency.

E. Hellmers states in 'Bacterial wilt of carnations and its control' (pp. 985–994) that the method of obtaining cuttings free from *Pseudomonas caryophilli* [**34**, p. 525] is now used commercially on a large scale in Denmark in 2 nurseries.

G. Scholten, dealing with 'Wilting diseases of carnations in the Netherlands' (pp. 995–1,002), states that with improved growing conditions stem rot (mostly *Fusarium culmorum*) no longer causes much damage. *F. oxysporum* [cf. **37**, p. 481] is no longer a serious problem, the varieties commonly grown being only slightly susceptible. Control of the vascular diseases caused by *Verticillium cinerescens* [loc. cit.] and bacteria (*P. caryophilli* and a species of *Erwinia*) [cf. **36**, p. 31] remains a problem; steam sterilization does not kill all the pathogens present in the soil at a depth of more than 30–50 cm., and the 2nd year after treatment wilting may have become so severe that carnation growing is no longer profitable. It is legally forbidden in the Netherlands to sell cuttings from greenhouses where vascular diseases are known to be present, and the premises of all firms growing cuttings and young plants for the trade are regularly inspected.

In a paper [in German] (pp. 1,008–1,018) on the disinfection of flower bulbs and corms from the Laboratorium für Gärtnerischen Pflanzenbau, Kiel-Kitzeberg, H. Pape gives the results of tests. Hot water disinfection (43·5° C., 30 min. with no plant damage) was found to be suitable for gladioli against *Urocystis gladioli*. Formalin proved effective for gladioli, 4% for ½ hr. against *Pseudomonas marginata* or ¾ hr. against *P. marginata*, *Septoria gladioli*, and *Sclerotinia gladioli*; for tulips 0·25 and 0·4%, 1 hr. against *Botrytis tulipae*, or 0·4%, 1–8 hr. against *S. tuliparum*; and for narcissi, 0·4%, 1 hr. against *B. narcissicola* and *B. polyblastis*. If the temp. of

the formalin was raised to 43·5° tulips treated with 0·5% for 1 hr. suffered damage, whereas narcissi were only damaged after 3 hr. or with 1% for 1–3 hr.

Mercuric chloride at 0·1% was tested only on gladioli and was successful at 2 hr. against *P. marginata* and *Fusarium orthoceras* var. *gladioli*, 2–14 hr. against the latter, 2–8 hr. against *Septoria gladioli*, 2–12 hr. against *P. marginata*, 2–17 hr. against core rot (*Botrytis* sp. and *F.* spp.), but only 2–3 hr. on scaled corms. Many gladiolus vars., however, are sensitive to $HgCl_2$.

Ceresan wet was successful at 0·25%, 8–18°, for ½–1 hr. for tulips against *B. tulipae*; for gladioli against *P. marginata*, *F. oxysporum*, and *S. gladioli*; for narcissi against *B. narcissicola*; and at 0·1%, 43·5° for 3·5 hr. for simultaneous disinfection against *Ditylenchus dipsaci* and *F.* basal rot; in general 0·25%, 18°, for 1 hr. is recommended. Results with germisan wet were similar to those with ceresan, except that where damage did occur, particularly at higher conc., it was somewhat less severe.

Only a few tests were made on gladioli with the Dutch Hg preparations bloembollengermisan (satisfactory at 0·25%, 16–17°, for 1–4 hr.) and AA bulba (good results on gladioli and narcissi). At 0·1%, 43·5°, for 2–4 hr. no damage was caused by AA bulba but at 0·25%, 43·5°, for 3–4 hr. narcissi and gladioli suffered some damage. At 4 hr. narcissi produced numerous sterile flowers.

Of the dry disinfectants, tritisan and AA tiram were not harmful in diluted form to gladioli, tulips, or narcissi and should be used at 5 g./250 g. bulbs or corms. Brassicol, too, did not damage gladioli or narcissi.

M. L. Dufrénoy & J. Dufrénoy discussed [in French] (pp. 1,019–1,022) historical aspects of tulip breaking virus disease and 'parrot' tulips.

F. G. Meyer, R. A. Benedict, & G. Koch reviewed (pp. 1,235–1,238) the 'Use of antibiotics in control of ornamental plant diseases'.

D. Mulder, C. A. R. Meynecke, & J. Floor describe (pp. 1,239–1,242) 'Indexing rootstocks and graftwood of apple for the presence of the 'rubbery wood' virus disease by using the variety Lord Lambourne' [cf. **35**, p. 374, *et passim*]. The presence of the disease was determined (1) by bending 2-year-old stems and (2) by testing the wood with phloroglucin for lignin reaction at 3 different levels of the stem. The discrepancy between the results of the 2 methods was considerable, especially with the weaker rootstocks, with which the bending method gave almost the total number of affected trees, whereas with strong ones it gave a lower number than the colour method. The bending method should be discarded. None of the sources of graftwood of Golden Delicious was free from the virus.

Some of the results given by P. Prévot and M. Ollagnier [in French] (pp. 1,382–1,397) of surveys for mineral deficiencies in oil palm in Dahomey, Ivory Coast, and French Congo and in groundnut in Senegal have been noticed [**37**, p. 733]; also of Mn toxicity in groundnut in the French Congo.

J. P. Laoh reports (pp. 1,403–1,408) 'Observations on the spraying and dusting of copper fungicides against blister blight (*Exobasidium vexans* Massee) in tea' [cf. **35**, p. 239] in Indonesia. Both 4% Cu dust and Shell Cu naphthenic acid were satisfactory and controlled shoot infection at 450 ft. The interval between 2 sprays (10–12 days) was twice as long as for the dust, and the amount of Cu/ha. (40 g./10 l. spray/acre) was much lower for the spray. The quality of the tea from the sprayed area was poor. Cu naphthenic acid compounds are not at present suitable for use on tea. D. Tollnaar's paper (pp. 1409–1411) on the control of *Mycosphaerella musicola* on banana has been noticed [**34**, p. 381].

I. Reichert gives (pp. 1,413–1,422) 'New light on xyloporosis and tristeza virus diseases' [cf. **36**, pp. 23, 317], noting certain environmental and genetical factors which affect the symptoms. Regret is expressed that those who have studied tristeza disease have not provided details of the precise environmental conditions in which their experiments were conducted. A planned, international, co-operative project is required.

Describing 'Breeding of stocks for citrus resistant to gum-disease and mal tristeza', H. J. Toxopeus states (pp. 1,423–1,427) that cuttings of 4 healthy stocks from Java apparently highly resistant to gum disease (*Phytophthora parasitica*) [**15**, p. 364; **27**, p. 131] are now growing in the glasshouses of the Laboratory of Tropical Agriculture, Wageningen.

A description, illustrated with 4 coloured plates, of 'The major causes of die-back of citrus in Indonesia and their control' is given (pp. 1,485–1,500) by J. Reitsma and T. Hadiwidjaja. Most forms of die-back would not occur, or only sporadically, if cultural conditions were correct. One of the principal causes of root rot is the decay induced by poor soil conditions. Each tree needs 20–30 kg. of farmyard manure when planted and on poor soils up to 300 kg. afterwards. Chlorosis and die-back appear to be due primarily to deficiencies of Zn, Fe, and Mn. A Zn+Fe spray should be given in the nursery and continued as a routine in the young groves; the 1st field application should be given 3 months after transplanting and the next as soon as the flush starts, and repeated every 2 weeks during growth and with each new flush.

A report is given (pp. 1531–1647) of the International Conference on the improvement of vegetable vars. held at Wageningen on 26–27 Aug. 1955. Dealing with trends in the development of new vegetable vars., O. Banga summarizes in tabular form the vars. grown in the different countries and the diseases to which they are resistant. A summary is given of the contributions made to the development of disease-resistance vars. by the various agricultural departments of Australia. C. Walkof deals with breeding for resistance in Canada, G. Trébuchet in France, J. C. Haigh in Great Britain, K. Kanazawa in Japan, O. Banga, J. M. Andeweg, J. A. Huyskes, & J. R. Jensma in Holland, A. H. Bremer & A. R. Persson in Norway, and work done in S. Africa on this subject is also noted.

Report of the Department of Agriculture, N.S.W., for the year ended 30th June, 1957.—110 pp., 15 fig., 1958.

Much of the information in the plant pathology section (pp. 60–65) of this report has been noticed [cf. **37**, pp. 133, 326]. Foot rot (*Helminthosporium sativum*) [*Cochliobolus sativus*] and take-all (*Ophiobolus graminis*) were the most serious diseases recorded on wheat (up to 75% loss). *Kabatiella caulivora* was newly recorded on berseem clover (*Trifolium alexandrinum*), while *T. arvense* was attacked by *Cercospora zebrina* [cf. **36**, p. 307]. A root rot of *Vicia sativa* caused by *Sclerotium rolfsii* and an unidentified fungus is being investigated. Only an F_4 and an F_5 line of the bean [*Phaseolus vulgaris*] var. Hawkesbury Wonder × Westralia showed dual resistance to races Aust. 6 and Aust. 8 of *Colletotrichum lindemuthianum*, other lines being resistant to 1 race. The virus causing drop head wilt of tomatoes [**37**, p. 134] retained its virulence after a series of transmissions under conditions inhibiting the development of necrosis.

Working buds of vigorous watershoots, the quick growth of which outdistances the virus, on to *Citrus trifoliata* offers a possible means of obtaining citrus stock free from scaly butt. B toxicity caused a serious leaf fall and decline of citrus trees; *Corynespora citricola* [cf. **36**, p. 666] caused leaf spotting.

Thiram sprays against apple black spot (*Venturia inaequalis*) gave better fruit yields than lime-sulphur (251·6 and 171·5 lb./tree, respectively). A 0·1% phenyl mercuric chloride (PMC) spray checked perithecial development, while even 0·01% was effective during the peak of perithecial development; the bulk of inoculum in Oct. came from the last leaves to fall (in late May, early June). Pear black spot (*V. pirina*) caused more damage than apple black spot; the heaviest ascospore discharge of *V. pirina* (1,919 spores/cu.m. of air) occurred on 16 Oct. Karathane and S provided only a moderate control of *Podosphaera leucotricha*, severe on apple.

Application on 9 Oct. of 0·01, 0·005, 0·0025, and 0·00125% PMC to peach (at

petal fall) and apricot trees (at calyx drop) resulted in some phytotoxic spotting of apricot leaves at the 2 higher concs., but no injury to peach; 0·005 and 0·0025% on 25 Oct. caused rather severe leaf spotting on both. In addition to *Phytophthora cinnamomi*, causing destruction of apricot and peach trees, 2 other spp. isolated from the roots have been identified as *P. megasperma* and *P. cryptogea*; their pathogenicity is to be tested. Streptomycin nitrate sprays failed to control bacterial canker (*Pseudomonas syringae*) of cherries.

The vines Palomino and Waltham Cross were most susceptible and Cornichon moderately so to dead arm (*Phomopsis* [*Cryptosporella*] *viticola*), which in favourable conditions is widespread; 9 other vars. were resistant. A disease of sultana vines, closely resembling the Californian black measles [**31**, p. 590] and producing black fruit blotching and leaf mottle, was recorded at Koraleigh.

Standard 1:1,000 $HgCl_2$ dips gave as good control of gladiolus corm diseases as any other treatment. *Centrospora acerina* [**37**, p. 327], found on silver beet, watercress [*Barbarea vulgaris*], celery, and carrot, was newly recorded on pansy. *Cercospora* [*Mycosphaerella*] *rosicola*, generally associated with a leaf spot [cf. **19**, p. 348], but causing stem canker of roses, was also a new record.

Report of the Department of Scientific and Industrial Research, New Zealand, for the year ended 31 March, 1958.—90 pp., 1958.

Further reference is made (pp. 31–32) in this report [cf. **37**, p. 7] to periodic tree death in shelter belts throughout New Zealand, especially after wet winters. The trees affected are *Pinus radiata* [**37**, p. 381], *P. muricata*, *Cupressus macrocarpa*, and *Chamaecyparis lawsoniana*. Recent work by the Plant Diseases Division has shown the condition to be associated with *Phytophthora* spp. in the soil, as is a high mortality of trees in some of New Zealand's pine forests [loc. cit.].

Investigations (p. 36) have shown that under commercial glasshouse conditions high atmospheric humidity for a period of several days may lead to a high incidence of blotchy ripening of tomatoes [**36**, p. 517], which may make fruit unmarketable and cause losses up to 90%.

The projects of the Plant Diseases Division are summarized by E. E. Chamberlain and the publications are listed (pp. 68–72).

Bärner (J.). **Bibliographie der Pflanzenschutzliteratur 1948–1949.** [Bibliography of plant protection literature 1948–49.]—xli+689 pp., Berlin, Paul Parey, 1958. [English and French introduction, contents, and page headings.] DM. 65.

This bibliography, comprising over 21,100 titles, is compiled as hitherto [cf. **35**, p. 836].

Bärner (J.). **Literaturquellen und ihre Kürzungen aus der Bibliographie der Pflanzenschutzliteratur.** [Sources of literature from the bibliography of plant protection literature and their abbreviations.]—167 pp., Berlin, Biologische Bundesanstalt für Land- und Forstwirtschaft, 1958. [Mimeographed. Not for sale.]

The abbreviations used for some of the approx. 3,000 publications listed depart from the usage of the *World List of Scientific Periodicals* on grounds of difficulty in following the latter.

Clifton (C. E.), Raffel (S.), & Starr (M. P.). **Annual review of microbiology. 12.**—581 pp., Palo Alto, California, Annual Reviews, Inc., 1958. $7 (U.S.A.), $7.50 (elsewhere).

This volume [cf. **37**, p. 137] includes a review of present knowledge of the genetics of fungi (pp. 365–382: 159 ref.), in which H. E. Wheeler covers, *inter alia*, the genetics of sexuality [cf. **36**, p. 111] and the genetics of phytopathogens.

W. J. Zaumeyer (pp. 415–440; 205 ref.) reviews the use of antibiotics in the control of plant diseases [cf. **37**, p. 759].

E. M. Hildebrand (pp. 441–468; 204 ref.) examines the problem of masked virus infection in plants, with reference to a number of economically important diseases.

Sutton (M. D.), Katznelson (H.), & Quadling (C.). **A bacteriophage that attacks numerous phytopathogenic Xanthomonas species.**—*Canad. J. Microbiol.*, **4**, 5, pp. 493–497, 1 pl., 1958.

The authors report from the Canada Dept Agric., Ottawa, the isolation of a lytic phage attacking phytopathogenic *Xanthomonas* spp. (including *X. campestris*). It has a burst size of ca. 100 phage particles/bacterium and typical phage morphology.

Manigault (P.) & Salmon (Janine). **Indices microradiographiques témoignant de la réactivité des tissus de Pelargonium zonale infectés par Agrobacterium tumefaciens.** [Microradiographic indications demonstrating the reactivity of *P. zonale* tissues infected by *A. tumefaciens*.]—*Bull. Microscop. appl.*, Sér. 2, **8**, 1, pp. 14–20, 1 pl., 1 fig., 1 diag., 1958.

The salient points of a previous study revealing the dense opacity of meatus situated near crown gall tumours on *P. zonale* stems [**38**, p. 57] are recapitulated on account of their similarity to the results of later observations on the woody vessels of the same host and *Datura* [? *stramonium*].

Leatherdale (D.). **A host catalogue of British entomogenous fungi.**—*Ent. mon. Mag.*, **94**, pp. 103–105, 1958.

Prepared from Petch's lists [**28**, p. 125] and more recent records.

Atti del terzo Convegno sugli anticrittogamici acuprici, Alba, 20 novembre, 1957. [Proceedings of the 3rd Convention on non-copper fungicides, Alba, 20 Nov. 1957.]—*Notiz. Malatt. Piante, 1958*, 43–44 (N.S. 22–23), pp. 1–340, 4 pl., 2 fig., 77 graphs (2 col.), 1958. [Numerous English summaries.]

These Proceedings [cf. **37**, p. 16], after an introduction by R. Ciferri, cover the chemistry of non-Cu fungicides and laboratory experiments therewith (pp. 9–85); the practical efficacy of these products (pp. 89–259); incidental effects (pp. 263–322); and miscellaneous papers (pp. 325–337).

A. Corte & L. Grandi (pp. 9–46) give an account of laboratory tests of the fungicidal activity of non-Cu fungicides used in association with Cu products. R. Ciferri, A. Corte, & L. Grandi (pp. 47–51) report that zineb + micronized S had a protective and synergistic effect upon *Stemphylium* sp. L. Grandi, A. Corte, & R. Ciferri (pp. 52–65) deal with the decline in the fungicidal efficiency of zineb and ziram in the laboratory and the field as a function of time. One application of zineb (or, better, of ziram)/fortnight, even in rainy weather, affords good protection to vines against downy mildew [*Plasmopara viticola*]. A. Corte, R. Ciferri, & L. Grandi (pp. 66–71) adduce evidence that the instantaneous fungicidal efficacy of zineb tested against *S. sarcinaeforme* increases with the fineness of the particle. The persistence of micronized and ordinary zineb at 30° C. is about the same. V. Corradini (Milan) deals (pp. 72–76) with the standardization of laboratory methods for evaluating antifungal activity. F. Galbiati, E. Refatti, & V. Corradini (pp. 77–85) describe laboratory tests of the activity of various types of water-suspensible S (colloidal, micronized, ground, and less finely ground) against *Erysiphe cichoracearum* on tobacco. The materials differed little in their antifungal activity, but for any given amount of S the colloidal type was slightly superior. The curative

effect, on the other hand, was strictly a function of the size of the S particles, fungicidal activity diminishing markedly as this increased.

In the 2nd part, D. Picco (Pavia) (pp. 89–96) gives the results of field tests in different parts of Italy with Cu, zineb, and ziram against vine downy mildew. In conditions favouring infection the best protection was given by zineb. P. Consiglio (pp. 97–109) described tests with zineb against *P. viticola* on dessert grapes in Apulia: the 1955–57 results were excellent. G. Borzini & R. Brizzi (pp. 110–119) give details of spraying tests in Piedmont in 1957 against *P. viticola* with non-Cu preparations and others containing only a slight amount of Cu. C. Giorgi (Pavia) (pp. 120–125) describes experiments in 1957 in which complete control of *P. viticola* in circumstances very favourable to infection was given by the non-Cu-containing products aspor, vitex, antir, and copra-mat; vines dusted with S at the beginning of growth, at flowering, and after fruit set, and treated with wettable and colloidal S before and after flowering, remained unaffected by *Oidium* [*Uncinula necator*]. V. Tullio (Modena) (pp. 126–128) describes further experiments which demonstrated that non-Cu products containing zineb can be as effective against *P. viticola* as those containing Cu. D. Ferraris (pp. 129–132) reports on further work in the Monregale area on spraying with zineb against *P. viticola*. E. N. Maseroli (Parma) (pp. 133–135) found that zineb gave satisfactory control of *P. viticola*. G. Miotto (pp. 136–141) (Padua) ascertained that Cu salts can be replaced by zineb for the control of *P. viticola*. A. Messori (Alessandria) (pp. 142–147) reports the successful control of the disease with zineb in vineyards near Alessandria. P. Ricci (pp. 148–152) (Acqui Terme) found that non-Cu products containing zineb (aspor C, aspor A, and 'experimental aspor' 60–30–10) in a year (1957) highly favourable to infection by *P. viticola* gave better control than Bordeaux mixture. The addition of colloidal S (0·3–0·2%) is indispensable for the control of *U. necator*, and the spray should be followed by the normal S dusting. P. Alghisi (pp. 153–173) presents the results of 1 year's tests at the University of Padua against *P. viticola* with a product containing zineb, used in comparison with Bordeaux mixture. The protection afforded by Bordeaux was approximately the same as that given by the zineb product, and both gave better protection than ziram. At the end of July and early Aug. the fruit clusters on vines treated with Bordeaux were least affected, those with the ziram product came next, and those with zineb last. M. Brazzola & G. Brazzola (Milan) (pp. 174–179), found that aspor gave good protection to the fruit clusters of vines against *P. viticola*. M. Ambrosi (Trieste) (pp. 180–183) obtained good results at Trieste with thiram against grey mould (*Botrytis cinerea*) of the fruit. R. Ciferri (pp. 184–185) found that good control of *Gloeosporium ampelophagum* [*Elsinoe ampelina*] was given by zineb 0·5%.

E. Zucchi (pp. 186–188), at Parma, protected nearly 3,000 ha. of tomatoes in 1956–7 from the locally prevalent condition 'brusone', caused by *Phytophthora infestans*, *Alternaria solani*, *Septoria lycopersici*, *Cladosporium fulvum*, and *Phoma destructiva*, with applications of zineb 0·3 (up to 0·4)% + 1·5–2% colloidal S, at intervals of 10–15 days from before flowering until the 2nd 10 days in Aug. D. Picco (pp. 189–209) found that ziram, zineb, and copper oxychloride gave equally good protection to tomatoes against *S. lycopersici*. Against *P. infestans* (on the same host), zineb gave the best results, especially when mixed with colloidal S. G. Leone (Rome) describes (pp. 210–218) 2 years' spraying tests with non-Cu fungicides against tomato diseases near Salerno. Zineb gave satisfactory results and increased yields. C. A. Ghillini (pp. 219–224) describes tests at the Istituto di Patologia Vegetale, Padua, with a new non-Cu fungicide containing ziram and S against tomato diseases. G. Miotto (pp. 225–230) obtained satisfactory control of apple scab [*Venturia inaequalis*] by spraying with 0·15% zineb (tiezene). D. Rui & A. Cosolo Giussani (pp. 231–232) obtained good results with ziram sprays against *Taphrina deformans* and *Coryneum beijerinckii* [*Clasterosporium carpophilum*:

cf. **36**, p. 539] on peach. A. Matta (pp. 233–235) checked a very severe outbreak of apricot rust (*Puccinia* [*Tranzschelia*] *pruni-spinosae*) at Albenga (Savona) by spraying with zineb (aspor, 0·25%) in the last 10 days of June, at the end of July, and a month later. A. Pesante (Turin) (pp. 236–239) describes preliminary soil disinfection tests against *Verticillium albo-atrum* on peppermint [cf. **35**, p. 928] with non-Cu products, some in aqueous suspension, others in the form of a gas. The best results were given by chloropicrin. A. Caruso (Cosenza) (pp. 240–241) controlled peacock's eye of olive trees (*Cycloconium oleaginum* [cf. **36**, pp. 6, 39]) by applications of 0·35–0·4% zineb in spring and autumn.

E. Castellani, F. Beccari, & A. Matta (pp. 242–244) ascertained in laboratory experiments at the University of Turin that mycostatin (nystatin) [cf. **36**, p. 543] exerts a fungicidal effect upon the conidia of *Gloeosporium musarum* [cf. **36**, p. 199]. Application of the material to bananas in Somaliland, sent to Italy without refrigeration, checked infection to some extent, but had no effect on attack by an unidentified species of *Fusarium*. R. Trentini (Trento) discusses (pp. 245–250) the results of 5 years' spraying of vines with zineb. A. Cesarini (Perugia) presents (pp. 251–254) practical notes on the use of non-Cu products against *P. viticola* based on experience in a vineyard of about 150 ha. G. Palladini (pp. 255–256), from Pescara, discusses the practical efficacy of zineb against plant diseases. G. Battaglino (pp. 257–259) discusses the use of aspor against vine diseases in the hilly region of Alba.

Section 3 comprises papers by I. Cosmo & G. Pieri (pp. 263–266) on the side-effects of non-Cu fungicides; by O. Gosen (pp. 267–276) on the control of *P. viticola* and *U. necator* with Cu and non-Cu products and the effects of the treatments upon the vines; by D. Rui (pp. 277–278) on the favourable effects of ziram on the control of grey mould (*Sclerotinia fuckeliana*) [*Botrytis cinerea*] and the preservation of the berries; by M. De Rosa (pp. 279–281) on the favourable effects of zineb on vines injured by frost; by E. Baldacci & P. Bonola (pp. 282–287) on the increased vegetative development of vines treated with zineb and the evaluation of the effect by the 'Avena' test; by G. Emiliani (pp. 288–289) on the relation between non-Cu treatments and premature defoliation of the vine; by A. Cosolo-Giussani (pp. 290–292) on an attempt to control vine *Phylloxera* [*vastatrix*] with captan; by F. Bertossi & D. Picco (pp. 293–301) on the effect upon *Lupinus albus* seedlings of zineb, ziram, and nabam; by R. Carlone (pp. 302–303) on the improved colour of apples after spraying with captan; by F. Valenza (pp. 306–312) on the side-effects of fungicidal treatments; by F. Valenza (pp. 313–314) on the relation between the formation of carbohydrates and fungicidal treatments; by E. Trabucchi (pp. 315–320) on the biological activity of the dithiocarbamates; and by M.P. of the Compagnia Italiana Elicotteri (pp. 321–322) on the use of helicopters in the control of plant diseases.

Section 4 includes contributions by D. Picco (pp. 325–326) on the fungicidal efficacy of 'brestan' (Società Emelfa) [cf. **37**, p. 61]; by P. Consiglio (pp. 327–328) on the use of zineb; by G. Rojatti (pp. 329–332) on tests in 1955–57 in the vicinity of Venice on the spraying of vines with zineb against *P. viticola*; by the same writer (p. 333) on zineb and photosynthesis; by A. Rossi (p. 334) on the translocation of zineb; and by M. Ambrosi (p. 335) on the treatment of vine chlorosis with zineb.

Sijpesteijn (A. K.) & Janssen (M. J.). **Fungitoxic action of 8-hydroxyquinoline, pyridine-N-oxide-2-thiol and sodium dialkyl dithiocarbamates, and their copper complexes.**—*Nature, Lond.*, **182**, 4645, pp. 1313–1314, 1958.

Earlier (*Nature, Lond.*, **180**, p. 505, 1957) it was reported that the 1:2 Cu complex of 8-hydroxyquinoline (oxine) and pyridine-*N*-oxide-2-thiol [**37**, p. 574] were toxic to *Aspergillus niger*, whereas the 1:1 complex of the sodium dimethyl dithiocarbamates (NaDDC) [cf. **37**, p. 15] was toxic and the 1:2 complex not. The hypo-

thesis advanced that the difference was explicable in terms of the different solubilities of the complexes is now substantiated by observations on the more sensitive *Glomerella cingulata*. Unlike *A. niger*, *G. cingulata* does not show 'inversion growth' with NaDDC and Cu, and is inhibited by copper dimethyl dithiocarbamate. The data presented indicate that *G. cingulata* is more sensitive to all 1:2 complexes. It is concluded that below 50 p.p.m. the inhibition pattern of the dithiocarbamates is determined by the solubility of the 1:2 complex with Cu and the sensitivity of the fungus.

Johnston (T. P.), Rueggeberg (H. C.), & Block (S. S.). **Fungicidal activity and structure. Fungicidal activity of trichloromethyl thiolsulfonates.**—*Agric. Fd Chem.*, **5**, 9, pp. 672–674, 1957.

Fungicide screening tests with a series of trichloromethyl thiolsulphonates [**37**, p. 449] at the Tennessee Research Laboratories, College Park, Georgia, using *Curvularia lunata* and *Monilinia* [*Sclerotinia*] *fructicola* as test fungi, indicated that the trichloromethyl arenethiolsulphonates were highly effective as fungicides, but that their *o*-nitrophenyl analogues were not. Certain generalizations on the effect of structural variance on fungitoxicity are made.

Bulit (J.) & Louvet (J.). **Fongicides appliqués au pal ou à l'explosif en culture maraichère fruitière.** [Fungicides applied with an injector or an explosive in market gardens and orchards.]—*Phytiatrie-Phytopharm.*, **7**, 1, pp. 15–19, 1958.

At the Institut National de la Recherche Agronomique, Station Centrale de Phytopathologie Végétale, Versailles, chloropicrin applied with an injector was more effective than sprinkling with formalin solution for the control of *Fusarium oxysporum*, which had rendered the soil unsuitable for further melon growing, and for killing the sclerotia of *Sclerotinia sclerotiorum*, but in practice the results were irregular.

Against *Armillariella* [*Armillaria*] *mellea* in pure culture on fragments of apple wood or roots which were then buried in the ground, ampoules of chloropicrin (300 ml.) and ethylene bromide (200 ml.) placed with an explosive charge (300 g.) at a depth of about 1 m. gave satisfactory control over a radius of 1 m., the fungus being destroyed [**38**, p. 118].

Groves (A. B.) (Editor). **Results of 1957 fungicide tests.**—44 pp., U.S.A., American Phytopathological Society, 1958. $1.

For the 1st time the results of these annual tests [cf. **37**, p. 13] have been issued as a separate publication which includes a list of co-operators and their reports, lists of the materials tested arranged according to their composition, formulation, and source, and tabulations of the numerous tests according to the diseases of different classes of crops.

Darpoux (H.) & Ponchet (J.). **Contrôle de l'état sanitaire et désinfection des semences. Études réalisées en France.** [Estimation of seed health and disinfection. Studies conducted in France.]—*Proc. int. Seed Test. Ass.*, **22**, 1, pp. 375–392, 5 fig., 1957. [Received Sept. 1958. No ref.]

The authors present a concise summary of the results of studies conducted during the past 10 yr. at the Station Centrale de Pathologie Végétale, Versailles, on seed-borne diseases of cereals [**35**, p. 517], beet [**33**, p. 70], flax, colza [turnip rape: **35**, p. 418], and carrot, describing for each host the importance in France of the fungi investigated, the techniques used to assay the health of the seed, experiments on seed disinfection, and the phytotoxicity of some of the materials tested.

Ustilago nigra, first noted in France in 1949, is found on barley in the Paris area. *U. hordei* is present in Brittany but not in central France.

Moulds (mostly *Aspergillus* spp., including *A. glaucus*, and *Penicillium* sp.) on wheat, particularly in a damp year have been eliminated by 5-chloro-7-iodoxyquinoline (5 or 20%) without the adverse effects on germination caused by other products effective against moulds.

Apparently healthy wheat seed giving very poor stands was found to be infected to the extent of 95% by *Alternaria* sp., 62% by *Septoria nodorum*, 42% by *Fusarium nivale* [*Calonectria nivalis*], 34% by *Epicoccum* sp., and 3–20% by *F.* '*roseum*'. Only organic mercurials inhibited *C. nivalis* from growing out of the grain; it is noteworthy that hexachlorobenzene, of frequent use on seed in France, had no effect. The toxic limit for Hg on seed of not more than 15% moisture is 2% for dusts at 200 g./q.

An organic mercurial seed dressing reduced by 80 the percentage of beet seedlings infected by *Cercospora beticola*. Thiram increased the stand.

Against the pathogens present in the mucilage on flax seed, a preliminary coating of castor oil (60–70 g./q.) followed by 80% thiram at 200 g. is effective [**38**, p. 85].

Stemphylium radicinum has caused heavy losses of carrots, especially in the Nantes area. Seed is heavily contaminated. Organic mercurials and copper *o*-oxyquinolinate gave the most effective disinfection.

Ivanoff (S. S.). **The water-soak method of plant disease control in relation to microbial activities, oxygen supply, and food availability.**—*Phytopathology*, **48**, 9, pp. 502–508, 1 fig., 1958. [27 ref.]

At Mississippi Agricultural Experiment Station, State College, soaking unshelled groundnuts in tap water at room temp. for 24 hr. before sowing gave fungistatic control of *Fusarium*, *Penicillium*, *Rhizopus*, *Aspergillus*, *Rhizoctonia*, and *Sclerotium* [cf. **27**, p. 8] spp. and was as effective as treatment with standard fungicides in improving the stand in the field. Sugars and other soluble substances were removed from the shells, which thus became a poor substrate for fungal growth. As equal control was obtained with both running and standing water, microorganisms growing in the liquid during the soak period could have played no part in control. Oxygen exhaustion is unlikely to be a major factor as a supply is retained within the shell.

Control of *Helminthosporium sativum* [*Cochliobolus sativus*] on oats, however, was better with standing water than with running and best after a 36-hr. soak in sea water of 2·5–5% NaCl. Nutrients were again lost from hulls and kernels, and lack of O apparently played an important part in eliminating the parasite. Germination of seed of low vitality was less after soaking, an advantage in that weak seedlings were eliminated.

Belyaev (I. M.). Новый препарат меркуран для протравливания семян. [The new compound mercuran for seed treatment.]—Бюл. науч.-техн. информ. Н.-и. ин-та земледел. центр. р-нов нечерноземн. полосы. [*Bull. nauch.-tech. inform. Nauch.-issled. Inst. Zemled. tsentr. r-nov nechernozemn. polosi*], *1957*, 2, pp. 35–36, 1957. [Abs. in *Referat. Zh. Biol.*, *1958*, 13, p. 205, 1958.]

A survey has shown that since mercuran was introduced for seed treatment in different parts of U.S.S.R. against diseases and pests wheat yields have increased 17%, oats 20%, barley 22%, and the green weight of maize 10–40%.

Purdy (L. H.) & Holton (C. S.). **Differential corrosion of metals by seed treatment fungicides.**—*Phytopathology*, **48**, 9, pp. 508–512, 3 fig., 1958.

At Washington Agricultural Experiment Station, Pullman, metal strips were immersed for 4 months at 70–75° F. in solutions of 8 fungicides diluted to the manufacturers' recommendations for slurry-machine application, or in water. MEMA, emmi, and metasol M proved the most corrosive; panogen 42, ceresan

200, anticarie, and ceresan M the least. Undiluted, MEMA was the most corrosive, panogen 15 slightly so, and ceresan 75 and emmi not at all. The corrosive effects were generally similar on carbon shell and cold-rolled steel but none of the materials affected stainless steel.

SOMERS (E.). **Spray application problems : XLIII. Note on the preparation of Bordeaux mixture.**—*Rep. agric. hort. Res. Sta. Bristol, 1957*, pp. 82–84, [1958].

A preliminary note on studies of the properties of Bordeaux mixture prepared in various ways [cf. **37**, pp. 14, 329]. Adding conc. lime suspension to dil. copper sulphate solution (volume ratio 5:95), or pouring the two (equal volumes) into a 3rd vessel gave precipitates of greater efficiency, as judged by sedimentation and crystallization rates and the tenacity and fungitoxicity of the spray deposits, than 5 other methods, including the commonly used addition of strong $CuSO_4$ to weak lime.

COBBALD (T. E.). **Spray application problems : XLIV. A compressed air nozzle for small-volume spraying.**—*Rep. agric. hort. Res. Sta. Bristol, 1957*, pp. 123–127, 1 pl., [1958].

The nozzle described [cf. **35**, p. 910] consists of a shallow chamber ($\frac{1}{2}$ in. diam., $\frac{1}{8}$ in. deep) into which air is fed through 4 tangential ports ($\frac{1}{8}$ in. sq.), alternating with radial ports of the same dimensions, through which the liquid enters. The spray, initially formed at the points where adjacent air jets impinge, undergoes centripetal and axial acceleration before leaving the chamber via a single orifice at the centre (diam. $\frac{1}{8}$ in. or more; depth should not exceed $\frac{1}{32}$ in.). The principles underlying this construction are discussed and performance figures tabulated.

COBBALD (T. E.). **Spray application problems : XLV. The performance of a power knapsack mist sprayer.**—*Rep. agric. hort. Res. Sta. Bristol, 1957*, pp. 127–133, [1958].

The sprayer examined, weighing 31 lb. empty and comprising a centrifugal fan driven by twin V belts from a single-cylinder 2-stroke engine of 50 cc. capacity, was chosen as being representative of a number of similar makes. Performance figures are given in detail. The general conclusion drawn from a study of the Cu deposits achieved on the foliage of potato, apple, and plum was that such sprayers are best suited for applying small volumes of liquid/acre to crops offering little resistance to the passage of air through them, and in conditions where a high degree of uniformity of deposit is not essential. The uniformity achieved depends largely on the skill of the operator.

BAKER (K. F.). **The development of floricultural pathology in North America.**—*Plant Dis. Reptr*, **42**, 9, pp. 997–1010, 7 graphs, 1958.

The expansion of this field, especially in the last 15 yr., is compared with that of plant pathology as a whole by graphic analyses of the relative numbers of workers since 1925 and the records of publications.

SIBILIA (C.). **Possibilità e aspirazioni per la lotta contro le malattie delle piante.** [Possibilities and hopes in the control of plant diseases.]—Reprinted from *Scientia, Bologna*, Ser. 6, **52**, 6 pp., June, 1958.

The author reviews and discusses recent work in various countries on the control of plant diseases by the development of resistant vars. and the use of internal therapy. Reference is made to the breeding of wheat in the United States resistant to *Puccinia graminis*, particularly to race 15 B, and to potato breeding in Canada for resistance to the predominant local races of *Peronospora* [*Phytophthora infestans*].

The section on internal therapy includes the alleviation of nutrient deficiencies and the use of antibiotics against fungi and viruses.

Investigación agrícola en 'Tibaitata'. [Agricultural research at 'Tibaitata'.]—*Bol. misc. Minist. Agric. Colomb.* 1, xi+70 pp., 33 fig., 1 diag., 1 plan, 1958.

This booklet contains sections on wheat, barley, maize, potato, and beans, mentioning the main diseases affecting these crops and indicating resistant vars. and control. The phytopathological section (pp. 55–58) describes the plans of the Colombia Dept of Agronomic Research to assist growers.

McCallan (S. E. A.). **Determination of individual fungus spore volumes and their size distribution.**—*Contr. Boyce Thompson Inst.*, **19**, 4, pp. 303–320, 14 graphs, 1958. [23 ref.]

In this paper, already noticed in abstract [**37**, p. 79], the mean spore volumes of 24 spp. of fungi are tabulated. Size distribution was determined by χ^2 and t tests for symmetry and kurtosis. The distribution of 7 species was normal, of 12 log-normal, and of 2 intermediate; in 3 (owing to limited data) both types of distribution were indicated.

Sheffield (F[rances] M. L.). **Requirements of a post-entry quarantine station.**—*F.A.O. Pl. Prot. Bull.*, **6**, 10, pp. 149–152, 1958.

In this most useful contribution (presented at the meeting of the Inter-African Phyto-Sanitary Commission at Nairobi, Kenya, 14–18 Apr. 1958), the author, after stressing the essentiality of supervision by specialists in pathology, suggests a number of features desirable in a quarantine station. One designed to handle any species of plant is considered, the points dealt with covering site, staff, glasshouses, ancillary buildings and equipment, and general organization [cf. **35**, p. 149].

Riggenbach (A.). **Fomes noxius, a thiamine-deficient fungus.**—*Nature, Lond.*, **182**, 4646, pp. 1390–1391, 1958.

At the Rubber Research Institute, Ceylon, *F. noxius* grew in Knop solution with glucose and asparagine if thiamine was added; it was able to combine pyrimidine and thiazole, but could not assimilate either separately [cf. **30**, p. 117; **32**, p. 272].

Panek (Anita [D.]). **Composição em ácidos aminados de espécies de Aspergillus e Penicillium.** [The amino acid composition of species of *Aspergillus* and *Penicillium*.]—*Atti Ist. bot. Univ. Pavia*, Ser. 5, **15**, pp. 171–176, 1958. [English summary.]

Chromatographic studies at the Laboratorio de Microbiologia de Escola Nacional de Quimica, University of Brazil, showed that there were no qualitative differences in the amino acid composition within the genus *Aspergillus*, in spores or mycelium, regardless of the medium, the type of culture, or the species involved. The qualitative amino acid composition was the same as that of *Penicillium*, whatever the method of culture; virtually all the essential and commonly occurring non-essential amino acids are always present.

Natarajan (S.). **Glutamic acid decarboxylase in Fusaria.**—*Curr. Sci.*, **27**, 6, p. 210, 1958.

Chromatographic investigation of the amino acid composition of *Fusarium* in further work at Madras Christian College, Tambaram, India, led to the identification of γ-aminobutyric acid in the acid hydrolysate of *F.* [*oxysporum* f.] *vasinfectum* [**37**, pp. 214, 585]. The activity of the glutamic acid decarboxylase involved in its formation was highest with fructose and $(NH_4)_2SO_4$, of a number of C and N sources examined; opt. pH was 4·5, at 30° C.

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NOTE: 'Beet curly top' virus in Bulgaria (*R.A.M.*, **37**, p. 326) is not identical with the virus of the same name in America.

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